# Honda Aircraft Company

# AIRPLANE FLIGHT MANUAL

# HondaJet

## Model HA-420

Original Issue: December 8, 2015

Revision B2: March 3, 2017

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FAA Approved in the Normal Category based on 14 CFR Part 23. This document must be carried in the airplane at all times and kept within reach of the pilot during all flight operations. This manual includes the material required to be furnished to the pilot by 14 CFR Part 23.

FAA Approved by: Christina M. Underwood

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**Federal Aviation Administration**

Registration No.:

Part No.: HJ1-29000-003-001

# Honda Aircraft Company



Published by

Honda Aircraft Company
6430 Ballinger Road
Greensboro, NC 27410 USA
www.hondajet.com

# LIST OF EFFECTIVE PAGES

This list contains all current pages with effective revision date.

Use this list to maintain the most current version of the manual:
Insert the latest revised pages. Then destroy superseded or deleted pages.

**Note:** A vertical revision bar in the left margin of the page indicates pages that have been added, revised or deleted.

## MODEL HA-420 AFM



## SECTION 1 - INTRODUCTION



## SECTION 2 – LIMITATIONS

## SECTION 3 – EMERGENCY PROCEDURES



## SECTION 3A – ABNORMAL PROCEDURES



## SECTION 3B – ADVISORY PROCEDURES



## SECTION 4 – NORMAL PROCEDURES



## SECTION 5 – PERFORMANCE

## SECTION 6 – WEIGHT AND BALANCE



## SECTION 7 – SUPPLEMENTS

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# RECORD OF REVISIONS

| REV. NO. | ISSUE DATE | REVISION DESCRIPTION |
|---|---|---|
| A-1 | 12-18-2015 | Placard information added in Section 2 |
| A-2 | 3-31-2016 | ICE DETECTED CAS maintenance instructions added in Section 3B. EASA requirements were added in Sections 2 and 4 and minor format/font updates were made throughout document. |
| A3 | 7-1-2016 | Reduced Vertical Separation Minimum (RVSM) Airspace related changes |
| B | 10-30-2016 | Flight into Known Icing (FIKI) information added. Also added CPDLC, SurfaceWatch, Windshear and general formatting updates. |
| B1 | 12-23-2016 | Removed required fuel additive section. Added icing inhibitor to approved fuel additives section. |
| B2 | 3-3-2017 | Added content for additional approved fuels, RVSM, and grammatical and formatting enhancements. |
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# RECORD OF TEMPORARY REVISIONS

Approved temporary changes must be included in this manual for all flight operations.

| TEMP. REV. NO. | TEMP. REV. DATE | TEMP. REVISION DESCRIPTION | APPROVED BY |
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# LIST OF SERVICE BULLETINS

The following is a list of active Service Bulletins applicable to the operation of this airplane and incorporated into this manual.

| SB NO. | SB REV. NO. | REVISION INCORPORATED | SB TITLE | EFFECTIVITY |
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## Honda Aircraft Company

# DOCUMENTATION GROUP

The following is a list that defines the group of documents that provides pilots with the information required for the safe and efficient operation of the airplane.

This documentation group is effective for serial numbers SN-49 and after, and prior airplanes SN-11 thru SN-48 with HAC Service Bulletin HA-420-42-001 installed.

Serial number SN-11 thru SN-48 without HAC Service Bulletin HA-420-42-001 installed continue using HJ1-29000-003-001 Rev A3 until compliance with HAC Service Bulletin HA-420-42-001 is achieved.

| MANUAL PART NO. | REV. NO. | MANUAL | RELEASE DATE |
|---|---|---|---|
| HJ1-29000-003-001 | B2 | Airplane Flight Manual | 3-3-2017 |
| HJ1-29000-035-001 | B2 | Electronic Checklist | 3-3-2017 |
| HJ1-29000-005-001 | B2 | Pilot’s Operating Manual | 3-3-2017 |
| HJ1-29000-007-001 | B2 | Quick Reference Handbook, Vol I and II | 3-3-2017 |

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# INTRODUCTION

This Airplane Flight Manual (AFM) contains the material required to be furnished to the pilot by Federal Aviation Regulations.

This AFM must be carried in the airplane at all times and it is the owner/operator's responsibility to ensure that all issued, applicable revisions and supplements are incorporated.

This AFM has been prepared to provide pilots with the information required for the safe and efficient operation of the airplane.

Honda Aircraft Company supports authorized facilities worldwide for ease of maintenance and service on our aircraft. For information on how to obtain revisions for this manual or other Honda Aircraft Company service publications, visit the HondaJet Connect website: https://hondajetconnect.com/.

# SECTION CONTENTS

**Section 2 – Limitations** Contains FAA approved operating limitations, which must be observed during aircraft operations except where a deviation is specifically authorized.

**Section 3 – Emergency Procedures** Contains FAA approved procedures to protect the occupants and airplane from serious harm during critical conditions requiring immediate response. Pilots should memorize procedural steps highlighted with bold type in a red box, so they can execute without the checklist.

**Section 3A – Abnormal Procedures** Contains FAA approved procedures to maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure.

**Section 3B – Advisory Procedures** Contains FAA approved procedures to maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure.

**Section 4 – Normal Procedures** Contains FAA approved routine operating procedures for the aircraft and its systems.

**Section 5 – Performance** Contains FAA approved data defining the aircraft performance under standard performance conditions.

**Section 6 – Weight and Balance** Contains FAA approved data intended to assist the operator in ensuring the aircraft is properly loaded.

**Section 7 – Supplements** Contains FAA approved supplements. The supplements include operating limitations, procedures, performance data, and other necessary data for the aircraft conducting special operations and/or equipped with specific equipment not covered by the basic AFM.

# REVISION INSTRUCTIONS

Honda Aircraft Company Technical Publications will update this manual and distribute revisions to this manual as required.

The List of Effective Pages shows the revision status of each page by notating the date of the revision. The Record of Revisions shows each revision and its date of release.

# MANUAL CONVENTIONS

## TABLE OF CONTENTS

A table of contents precedes each section of the manual, except Section 3B. In the Emergency and Abnormal Procedures sections, the table of contents is grouped by system. Within each system, procedures without an associated crew alerting system (CAS) message are listed first, followed by procedures with an associated CAS message. Within each group, the table lists procedures alphabetically.

## OPTIONAL EQUIPMENT

This manual contains limitations and procedures for using standard and optional equipment. Omit procedural steps referring to any optional equipment that is not installed.

## USE OF L(R) AND L-R

L(R) or L-R may precede a CAS message text. L(R) applies if the message annunciates as either L or R, depending on the affected side. L-R applies to a condition affecting both sides simultaneously.

## USE OF L(R) VERSUS 1(2)

L(R) terminology is used for systems that are located on the left or right side of the aircraft. An example is the engine anti-ice system, shown with either an L or R, preceding the associated CAS text. Other systems that are redundant but not associated with the left or right side use 1 or 2. An example is AHRS 1 which is a redundant system that can couple to the left or right side flight instruments.

## AURAL ALERTS

Aural alerts accompany specific conditions. AFM procedure titles include the aural alert where applicable. Aural alerts may be voice alerts or tones. A description of the aural alert is adjacent to the aural symbol as shown below.

The Aural symbol indicates a tone or voice alert will sound. Next to the symbol is the applicable tone or voice alert enclosed in quotation marks.

## NOTES, CAUTIONS, AND WARNINGS

This AFM uses the following notations to categorize procedures addressing safety or airplane operation.

WARNING **Operating procedures or techniques which may result in personal injury or loss of life if not carefully followed.**

***CAUTION*** *Operating procedures or techniques which may result in damage to equipment if not carefully followed.*

**NOTE** Additional, significant operating information requiring emphasis.

## CHECKLIST EXECUTION

A Checklist is complete when the --- END OF PROCEDURE --- statement is reached. In cases where the checklist continues for more than one page, the text ┌ **Procedure Continued** ┐ appears at the bottom of the page.

Some more complex emergency procedures have significant impact to the actions required to be followed during approach and landing. In these cases the emergency procedure has been written to incorporate all applicable normal procedure steps, and allows the crew to use the single checklist all the way through landing. These checklists include subsections titled the same as the associated normal procedures checklist. The number for each subsection starts at "1" to indicate the subsection represents the complete set of normal / abnormal steps.

## CHECKLIST EXECUTION (continued)

In some cases a checklist may be partially completed enroute, but have additional steps or considerations during the descent, approach, landing, or following landing. For these cases, the procedure contains subsection headers indicating in which phase of flight the step(s) should be executed. These checklists have continuous numbering.

**NOTE** Checklists may contain a step directing "Land as soon as possible" or "Land at nearest suitable airfield", but these steps are not necessarily the last step in the checklist. Continue through the remaining checklist steps while diverting to the selected airport. Checklist is not complete until --- END OF PROCEDURE --- is reached.

## SYMBOLS AND "IF" STATEMENTS

Certain procedures are dependent on prescribed conditions (see the example below). These conditions are presented in bold italics as independent "If" statements. If additional levels of "If" statements are required, they will be preceded by a symbol ( e.g., • or ○ ).

Procedures completed by following the actions in the "If" statement will be indicated by an --- END OF PROCEDURE --- statement following the last step. Otherwise, the additional steps following the other possible "If" statements should be followed.

## SYMBOLS AND "IF" STATEMENTS (continued)

**WING BLEED LEAK**

*A leak has been detected in wing anti-ice system*

1. **WING ANTI-ICE....................................................OFF**
2. Icing conditions ........................................................Exit

***If WING BLEED LEAK message remains***

3. L ENGINE BLEED .................................................. OFF
4. Altitude.................................. Descend to FL 250 or below
5. Land at nearest suitable airport

***If WING BLEED LEAK message remains***

6. L ENGINE BLEED ............................................. NORM
7. R ENGINE BLEED .................................................. OFF

- ***If no icing conditions are encountered prior to landing or SAT above 5 °C***

8. Land using normal procedures

**Figure 1. Example Procedure**

# CAS MESSAGE INHIBITING

The following describes features that inhibit certain CAS messages during certain conditions or phases of flight.

## TAKEOFF AND LANDING INHIBIT

CAS messages deemed non-critical during the takeoff or landing are inhibited until the takeoff or landing phase is complete.

## OTHER PHASE INHIBITS

During other phases of normal operations such as battery only operation on the ground or engine starting, some CAS messages which reflect unpowered equipment or automatic operations are inhibited. This simplifies the CAS list display and allows the pilot to more easily recognize a true failure condition.

## CASCADING FAILURES

Failure of some systems cause other associated failures. An example is an electrical bus failure which would subsequently fail equipment powered solely by that bus. In most cases, the design mitigates flight crew distraction by inhibiting cascading CAS messages related to the associated failure and allows the crew to more easily understand the primary failure. In these cases, the procedures for the posted CAS message include all the required steps for the un-annunciated failure, and a table is included at the end of the procedure listing inoperative equipment.

# CIRCUIT BREAKERS AND SOLID STATE RELAYS (SSR)

With the exception of the ALTERNATE GEAR RELEASE Extension procedure, these checklists do not require circuit breaker manipulation. However, if a circuit breaker is found to be open, it may be reset once. If the circuit breaker opens again, do not attempt another reset.

Solid State Relays are associated with specific electrical buses and equipment. In cases where an SSR trip may cause a failure, resetting the SSR is referenced in the appropriate checklist. As with circuit breakers, SSRs may be reset once. If the SSR trips again, do not attempt another reset.

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# SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY

Additional performance related terminology is included in Section 5 – Performance. Additional weight and balance terminology can be found in Section 6 – Weight and Balance.

| TERM | DEFINITION |
|---|---|
| %MAC | Percent of Mean Aerodynamic Chord is the CG location expressed as a percentage of the average chord length of the wing. |
| ADS-B | Automatic Dependent Surveillance-Broadcast |
| AMMD | Airport Moving Map Display |
| Arm | The horizontal distance from the reference datum to the center of gravity (CG) of an item. The airplane's arm is obtained by adding the airplane's individual moments and dividing the sum by the total weight. |
| ASI | Aircraft System Indication refers to the system information normally presented on the left side of the center display below the engine indications. |
| BEW | The Basic Empty Weight is the actual weight of the airplane including all operating equipment that has a fixed location in the airplane. The basic empty weight includes the weight of unusable fuel and full oil. |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| CG | Center of Gravity is the point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane. |
| EDM | Emergency Descent Mode |
| EIS | Engine Indication System refers to the engine information display which is normally presented on the top left of the center display. |
| FRT | Fixed Radius Transitions |
| GNSS | Global Navigation Satellite System |
| GP | Glidepath |

# SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| IDLE | The engine has four idle modes: flight idle, ground idle, ground anti-ice idle, and ground APU mode. Automatic selection between modes is accomplished by the FADEC based on inputs from the aircraft.<br><br>*Flight idle* mode is activated when the aircraft weight is off wheels and the thrust lever is in the IDLE detent. Flight idle provides minimum engine bleed pressure sufficient for ECS and anti-ice systems.<br><br>*Ground idle* mode is activated when the thrust lever is in the IDLE detent with aircraft weight on wheels. Ground idle provides a stable, minimum engine thrust level for ground operations.<br><br>*Ground Anti-Ice idle* mode is activated so a higher $N_1$ is commanded by the FADEC when either the wing anti-ice or engine anti-ice systems are activated.<br><br>*Ground APU idle* mode is activated when the thrust lever is in the IDLE detent with aircraft weight on wheels and only one engine is running. Ground APU idle provides a stable, minimum engine thrust level for single engine ground operations. |
| Ind. | Indication |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| ISA | International Standard Atmosphere (standard day) is an atmosphere where:<br>(1) the air is a dry perfect gas<br>(2) the temperature at sea level is 15 °C,<br>(3) the pressure at sea level is 29.92 in. Hg (1013.2 hPA), and<br>(4) the temperature decreases by 2 °C for every 1000 ft up to 36,089 ft, and is a constant -56.5 °C above 36,089 ft. |
| KCAS | Knots Calibrated Airspeed is the indicated airspeed corrected for position and instrument error. |
| KGS | Knots Ground Speed |
| KIAS | Knots Indicated Airspeed is the speed shown on the airspeed indicator when corrected for instrument error. The IAS values published in this manual assume no instrument error. |
| M | Mach Number is the ratio of true airspeed to the speed of sound. |
| $M_I$ | Indicated Mach Number is the Mach number shown on the airspeed indicator. Zero instrument error is assumed. |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| $M_{SB}$ | Speed Brake Operating Mach Number is the maximum Mach number that the speed brake may be operated. |
| MCT | Maximum Continuous Thrust is the maximum thrust rating available for continuous use. |
| MLW | Maximum Landing Weight is the maximum weight of the airplane allowed by structural design which should normally not be exceeded at touchdown. |
| Moment | The product of the weight of an item multiplied by its arm. |
| MRW | Maximum Ramp Weight is the highest weight of the airplane allowed by structural design. |
| MTOW | Maximum Takeoff Weight is the highest permissible weight of the airplane at brake release for takeoff. |
| MZFW | Maximum Zero Fuel Weight is the maximum permissible weight of the loaded airplane prior to usable fuel being added. |
| NWS | Nosewheel Steering |
| OSP | Overspeed Protection |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| PFD | The Primary Flight Displays are the left and right displays which present primary flight information as well as a multi-function tile. |
| Pressure Altitude | Pressure Altitude is the altitude read from the altimeter when the altimeter's barometric adjustment has been set to 29.92 in. Hg (1013 hPA). |
| Reference Datum | An imaginary vertical plane from which all horizontal distances are measured for balance purposes. |
| RF | Radius to a Fix |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| SAT | Static Air temperature is the ambient free air static temperature obtained from either<br>1) ground meteorological sources or<br>2) from the total air temperature obtained from onboard temperature measurement adjusted for compressibility effects. |
| SBAS | Satellite Based Augmentation System |
| SSR | Solid State Relay |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| Station | A location along the airplane fuselage measured in inches from the reference datum and expressed as a number. For example, a point 123 inches aft of the reference datum is Fuselage Station 123.0 (FS 123). |
| Tare | The weight of all items used to hold or position the airplane on the scales for weighing. Tare includes blocks, shims, and chocks. Tare weight must be subtracted from the associated scale reading. |
| TAT | Total Air Temperature is the onboard measurement of temperature not corrected for compressibility effects on the temperature probe. TAT will always be greater than SAT in proportion to Mach number. |
| TLD | Time Limited Dispatch is the period of time the operator may be allowed to defer short-time and long-time faults up to their specified time limits, at which time repair of the faults is required. Deferral and subsequent dispatch is only authorized in accordance with an approved MEL. |
| TO | Takeoff Thrust is the highest thrust rating available. |
| TOAC | Time of Arrival Control |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| $V_A$ | Maneuvering Speed is the maximum speed at which application of full control movement will not overstress the airplane. |
| $V_{AC}$ | Approach Climb speed which is equal to $V_{REF}$ + 5 knots. |
| $V_{ENR}$ | Enroute (single-engine) Climb Speed with gear and flaps up. |
| $V_{FE}$ | Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position. |
| $V_{LE}$ | Maximum Landing Gear Extended Speed is the maximum speed at which an aircraft can be safely flown with the landing gear extended. |
| $V_{LO}$ | Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted. |
| $V_{MCA}$ | Minimum Control Speed Air is the minimum flight speed out of ground effect in the takeoff configuration at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust. |

## SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY (continued)

| TERM | DEFINITION |
|---|---|
| $V_{MCL}$ | Minimum Control Speed Landing is the minimum flight speed out of ground effect in the landing configuration at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust. |
| $V_{MO}/M_{MO}$ | Maximum Operating Limit Speed is the speed limit that may not be deliberately exceeded in normal flight operations. V is expressed in knots, and M in Mach Number. |
| VNAV | Vertical Navigation |
| $V_{REF}$ | Reference Landing Speed is the landing approach speed with the airplane configured for landing. |
| $V_{SB}$ | Maximum Speedbrake Speed is the maximum speed where the speedbrake can be safely extended. |
| $V_{SR}$ | Stall speed is the lowest airspeed at which level flight can be sustained by the airplane's wings. |
| $V_{TIRE}$ | Maximum Tire Speed is the maximum ground speed permissible during ground operations. |

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# SECTION 2

# LIMITATIONS

## TABLE OF CONTENTS

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# LIMITATIONS

## INTRODUCTION

The limitations included in this section are required for safe operation of the airplane. Compliance with these limitations when operating the airplane is required by Federal Aviation Regulations.

## AIRSPEED LIMITS

The listed speeds are as displayed on the Primary Flight Display (PFD) unless otherwise specified.

### MAXIMUM OPERATING SPEED $V_{MO}/M_{MO}$

$V_{MO}$ .................................................. 270 KIAS

$M_{MO}$ .................................................. 0.72 $M_I$

### MANEUVERING SPEED $V_A$

Full application of pitch, roll, or yaw controls should be confined to speeds below the maneuvering speed. Avoid rapid and large alternating control inputs, especially in combination with large changes in pitch, roll, or yaw (e.g., large sideslip angles) as they may result in structural failures at any speed, including below $V_A$.

$V_A$ .................................................. 200 KIAS

## MAXIMUM LANDING GEAR SPEEDS

$V_{LO}$ .......................................................................... 200 KIAS

$V_{LE}$ .......................................................................... 200 KIAS

## MAXIMUM FLAP EXTENDED SPEED $V_{FE}$

Flaps TO/APPR ............................................................ 200 KIAS

Flaps LDG.................................................................... 160 KIAS

## MAXIMUM SPEEDBRAKE SPEED $V_{SB}/M_{SB}$

$V_{SB}/M_{SB}$ ........................................................................ No limit

## MINIMUM CONTROL SPEED AIR $V_{MCA}$

The speed shown is the minimum demonstrated speed with rudder bias operational.

Flaps UP........................................................................ 105 KIAS

Flaps TO/APPR ............................................................ 100 KIAS

## MINIMUM CONTROL SPEED LANDING $V_{MCL}$

The speed shown is the minimum demonstrated speed with rudder bias operational.

Flaps LDG...................................................................... 95 KIAS

## MAXIMUM TIRE SPEED $V_{TIRE}$

$V_{TIRE}$ is the maximum ground speed for both nose and main wheel tires.

$V_{TIRE}$ ........................................................................... 165 KGS

# ENGINE LIMITS

## ENGINE OPERATING LIMITS

| OPERATING CONDITIONS | | OPERATING LIMIT | | | | |
|---|---|---|---|---|---|---|
| **Thrust Setting** | **Time Limit (Minutes)** | **$N_1$ Fan % RPM** | **ITT °C** | **$N_2$ Turbine % RPM** | **Oil Press (1) PSIG** | **Oil Temp °C** |
| **Takeoff (TO)** | 5<br>10 OEI | 100.0 | 860 | 100.9 | 179 max<br>55 min | 165 max<br>10 min |
| | 2 | 100.0 | 885 | 100.9 | 179 max<br>55 min | 165 max<br>10 min |
| **Maximum Continuous (MCT)** | None | 100.0 | 860 | 100.9 | 179 max<br>55 min | 143 max<br>10 min |
| | 15 | 100.0 | 860 | 100.9 | 179 max<br>55 min | 165 max<br>10 min |
| **Idle** | None | (2) | 860 | (2) | 47 max<br>15 min | 143 max<br>-40 min |
| | 15 | (2) | 860 | (2) | 47 max<br>15 min | 165 max<br>-40 min |
| **Start** | None | ----- | 556 (3) | ----- | ---<br>(4) | -40 min |

**NOTES:**

(1) Minimum and maximum oil pressure varies based on $N_2$ speed. Values in the table are based on maximum $N_2$ for TO and MCT, and typical $N_2$ for Idle. Higher oil pressure indications are acceptable when oil temperature is below 60 °C. Oil pressure outside the normal range is indicated by red digits and a cautionary range is provided for low oil pressure and is indicate by amber digits. Operation above the maximum limit (with oil temperature above 60 °C) or in the cautionary range is indicative of an oil system malfunction that must be corrected before next engine operation.

(2) Idle $N_1$ and $N_2$ speeds vary with ambient conditions.

(3) ITT Start limits only apply when the FADEC START mode ICON is displayed on the Engine Indicating System.

(4) Oil pressure indications are inhibited when oil temperatures are below -40 °C.

## ENGINE INDICATOR MARKINGS

| Instrument | Lower Limit (red) | Normal Operating Range (green) | Transient / Caution Range (amber) | Upper Limit (red) |
|---|---|---|---|---|
| $N_1$ | ----- | 0 to 100.0 % | ----- | 100.0% |
| ITT | | 200 to 860 °C (1)<br>200 to 556 °C (2) | 860 to 885 °C (3) | 860 °C (1)<br>885 °C (3)<br>556 °C (2) |
| $N_2$ | ----- | 0 to 100.9 % | ----- | 100.9 % |
| Oil Pressure | (4) | (4) | (4) | (4) |
| Oil Temperature | -40 °C | 10 to 143 °C (5) | 143 to 165 °C (6)<br>-40 to 10 °C (7) | 165 °C (8)<br>143 °C (9) |
| Fuel Flow | ----- | 0 to 1300 pph | ----- | ----- |

**NOTES:**

(1) Applies for continuous operations
(2) Applies for engine starting
(3) Applies for 2 minutes with TO thrust
(4) Oil pressure operating limits are calculated by the FADEC based on engine operating conditions. For more specific information see the Pilot's Operating Manual, HJ1-29000-005-001.
(5) Oil temperature between 10 °C and 165 °C is normal for 5 minutes of operation at TO thrust.
(6) Applies from 5 to 15 minutes of operation above 143 °C
(7) Applicable to engine warm-up near IDLE only. Oil temperature should be in the normal range before selecting high power
(8) Applies for up to 15 minutes of operation
(9) Applies following 15 minutes of operation

## WIND LIMITS FOR ENGINE START

Tailwind.................................................................. 15 knots maximum

**NOTE** It is recommended the aircraft be aligned with the prevailing wind when the velocity is greater than 20 knots to minimize the possibility of an aborted start.

## AMBIENT TEMPERATURE LIMITS FOR ENGINE START

Engine starts are permitted following a ground cold soak at ambient temperatures to -40 °C, as defined in the Cold Weather Operations (Refer to Section 4 – Normal Procedures).

## APPROVED ENGINE GROUND OPERATIONS ENVELOPE

The following envelope has been approved for engine ground operations.

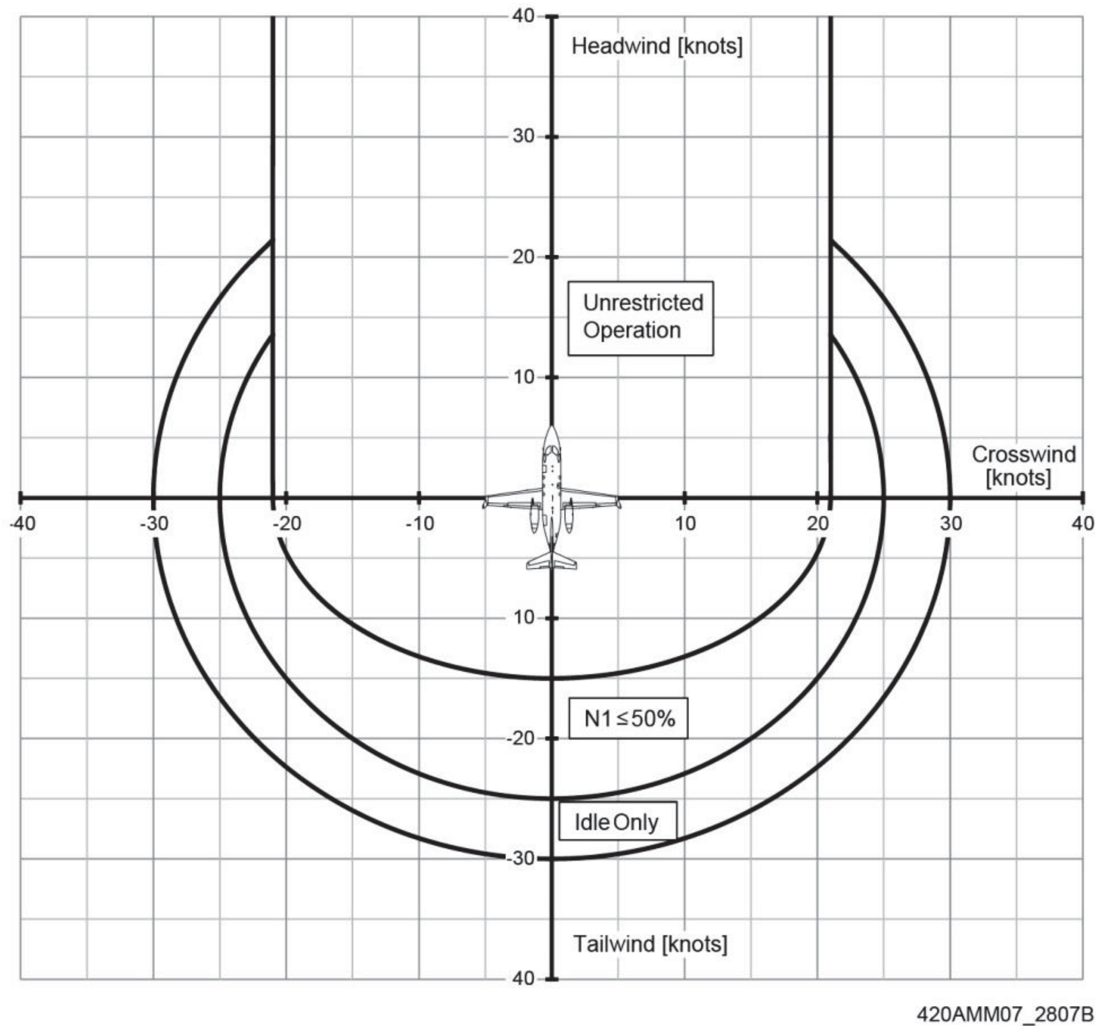


**Figure 2. Approved Engine Ground Operations Envelope**

**NOTES:**

- Headwind is not limited.
- Unrestricted operations with crosswind up to 21 knots and tailwind up to 15 knots.
- $N_1$ must be 50 percent or less for crosswind from 22 to 25 knots, and tailwind from 15 to 25 knots.
- IDLE only operations for crosswinds or tailwinds from 26 to 30 knots.
- For gusty conditions, an additional 5 knots are allowed.

## AMBIENT TEMPERATURE OPERATING LIMITS

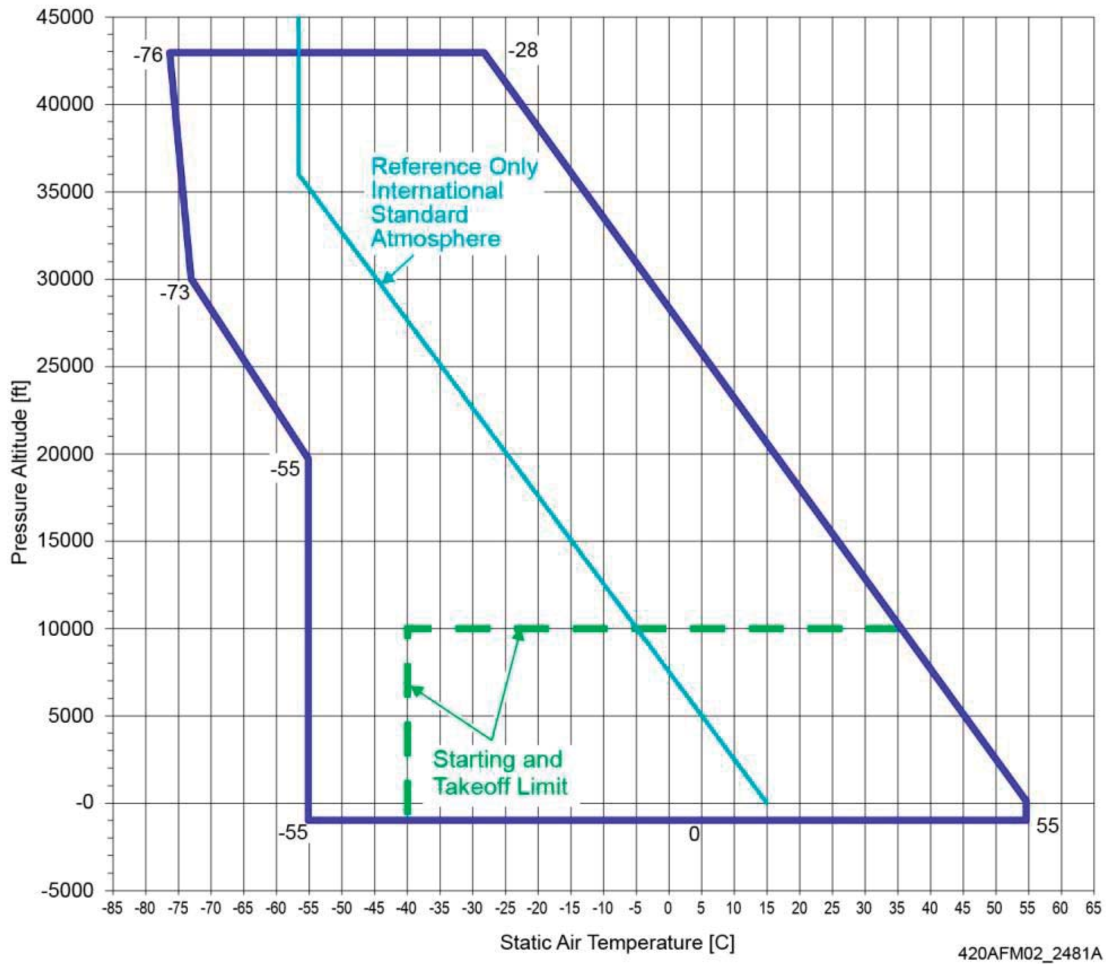


**Figure 3. Ambient Temperature Operating Limits**

## STARTER LIMITS (GROUND STARTS)

Starter duty cycle is as follows:

- 30 seconds on, 30 seconds off
- 30 seconds on, 30 seconds off
- 30 seconds on, 30 minutes off

## APPROVED OIL

The following Type II oils are approved. Additional approved oils may be found in the HF120 Service Bulletin 79-0001.

Oil brands have no incompatibilities, but it is recommended to avoid indiscriminate mixing of different brands of oil. Refer to the most recent version of HF120 Service Bulletin 79-0001 for details on changing from one brand of oil to another.

- AeroShell Ascender
- BP Turbo Oil 2380 / Exxon Turbo Oil 2380
- BP Turbo Oil 2197 / Exxon Turbo Oil 2197
- Mobil Jet Oil II
- Mobil Jet Oil 254
- Mobil Jet Oil 387

## APPROVED OIL CONSUMPTION

The maximum allowable oil consumption rate is 48 cc (0.05 quarts) per hour during normal operation.

# WEIGHT LIMITS

Maximum Ramp Weight .................................... 10,680 lbs (4,844 kg)

Maximum Takeoff Weight .................................. 10,600 lbs (4,808 kg)

Maximum Landing Weight ................................... 9,860 lbs (4,472 kg)

Maximum Zero Fuel Weight ................................. 8,800 lbs (3,992 kg)

Maximum Fwd Baggage Compartment Loading .......... 100 lbs (45 kg)

Maximum Aft Baggage Compartment Loading .......... 400 lbs (181 kg)

## TAKEOFF WEIGHT LIMIT

Takeoff weight is limited by the most restrictive of the following:

- Maximum Takeoff Weight
- Max Weight to Achieve Takeoff Climb
  Requirements......................... Refer to Section 5, Performance
- Max Weight to Meet Brake Energy
  Requirements......................... Refer to Section 5, Performance
- Takeoff Field Length ................... Refer to Section 5, Performance

## LANDING WEIGHT LIMIT

Landing weight is limited by the most restrictive of the following:

- Maximum Landing Weight

**NOTE** Perform Hard/Overweight Landing Inspection if the Maximum Certified Landing Weight is exceeded.

- Maximum Weight to Achieve Approach Climb
  Requirements......................... Refer to Section 5, Performance
- Maximum Weight to Meet Brake Energy
  Requirements......................... Refer to Section 5, Performance
- Landing Field Length.................. Refer to Section 5, Performance

# CENTER OF GRAVITY LIMITS

The center-of-gravity must be maintained within the Weight and CG Envelope during all flight conditions.

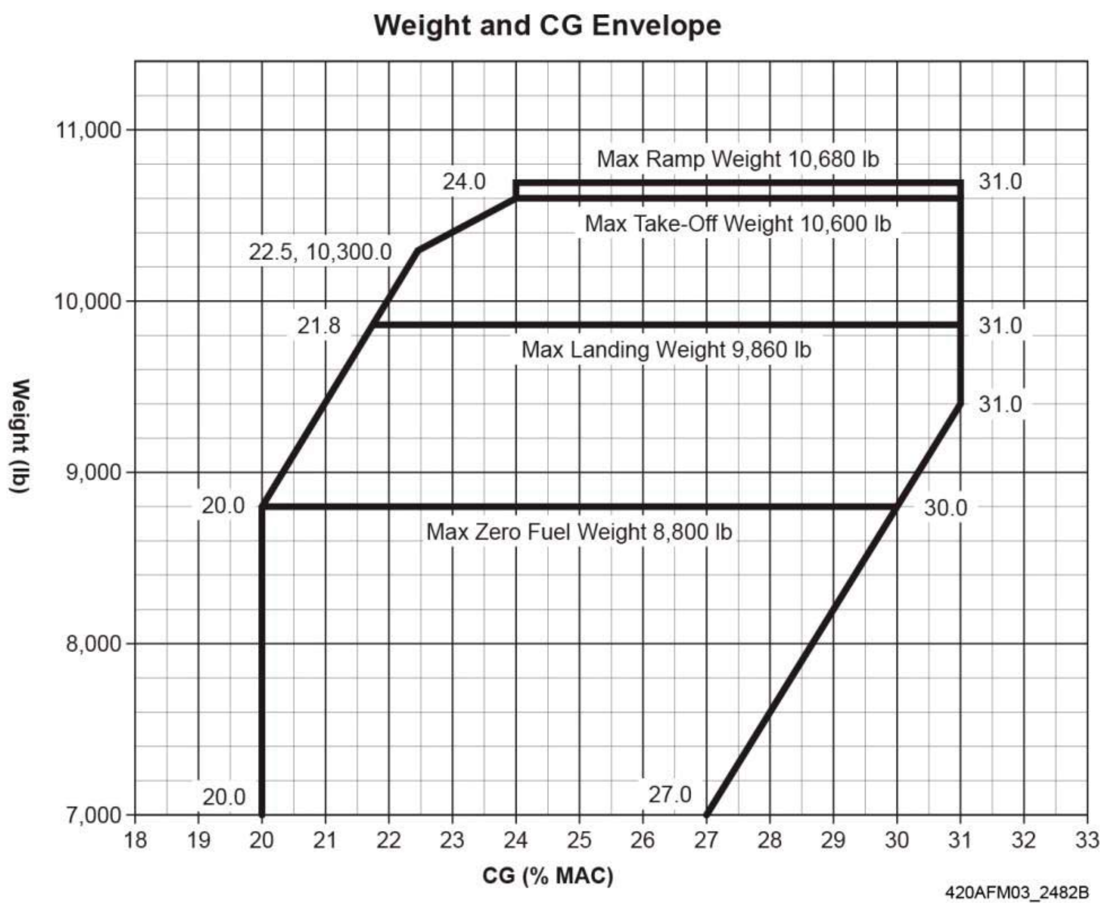


**Figure 4. Weight and CG Envelope**

# MANEUVER LIMITS

This airplane is approved in the Normal Category.

Maneuvers are limited to any maneuver incident to normal flying, stalls (except whip stalls), and steep turns in which the angle of bank is not more than 60 degrees.

Acrobatic maneuvers, including spins, are prohibited.

## MANEUVERING LOAD FACTOR LIMITS

Flaps UP ........................................................................+3.27g, -1.31g

Flaps TO/APPR and LDG.................................................. +2.0g, 0.0g

# MINIMUM FLIGHT CREW/OCCUPANCY LIMITS

## MINIMUM FLIGHT CREW

The minimum flight crew is one pilot in the left seat. For single pilot operation, the following equipment must be operative and available:

- Autopilot
- Quick Reference Handbook – Normal Procedures
- Quick Reference Handbook – Emergency/Abnormal Procedures

## MAXIMUM OCCUPANCY

- Single Pilot, 1 Pilot and 1 Passenger (cockpit), 5 Passengers (cabin when equipped with optional side-facing seat)
- Two Pilots, 1 Pilot and 1 Copilot, 5 Passengers (cabin when equipped with optional side-facing seat)

**NOTE** The lavatory seat is not certified for use during takeoff and landing.

## KINDS OF OPERATION

This airplane is certificated in the normal category and is eligible for the following kinds of operations when the appropriate instruments and equipment required by the airworthiness and the Minimum Equipment List are installed and operational:

- VFR Day
- VFR Night
- IFR
- RVSM
- Flight into Known Icing

# OPERATIONAL LIMITS

The following equipment must be checked and operable in accordance with the procedures in Section 4 – Normal Procedures prior to flight:

- Pitch Trim Systems (normal and standby)
- Stall Warning System
- Fire Detection and Suppression Systems
- Switchlights
- Cockpit Speakers

## OPERATION IN RVSM DESIGNATED AIRSPACE

This airplane has been demonstrated to meet the requirements of 14 CFR 91 Appendix G and FAA Advisory Circular 91-85, dated 21 August 2009, “Authorization of Aircraft for Flight in Reduced Vertical Separation Minimum Airspace” and is qualified for flight operations in RVSM airspace. This does not constitute operational approval.

In addition, this airplane has been demonstrated to meet the requirements of CS ACNS.E.RVSM (Reduced Vertical Separation Minimum) and is qualified for flight operations in European RVSM airspace. This does not constitute operational approval.

The following equipment must be operable prior to entering RVSM airspace:

- Air Data Computer 1 and 2
- Pilot and Copilot Primary Flight Displays
- Altitude Alerter
- Transponder 1 or 2
- Autopilot

## TAKEOFF AND LANDING

Takeoff Flap Settings ....................................................UP, TO/APPR

Landing Flap Setting ....................................................................LDG

Landing Flap Setting (with ice accumulated on airframe) ....TO/APPR

Runway Surface.................................. Smooth, Hard, and Paved Only

Runway Slope........................................................................... +/- 2%

Airfield Pressure Altitude..................................... -1,000 to 10,000 ft.

Ambient Temperature..........................................-40 °C to ISA+40 °C

Tailwind...........................................................................10 knots

Crosswind........................................................................20 knots

Turnaround Time...............................Refer to Section 5, Performance

## ENROUTE

Maximum Pressure Altitude...................................................43,000 ft

Maximum Altitude for landing gear extension........................18,000 ft

Maximum Altitude for flap extension

- TO/APPR .........................................................................18,000 ft
- LDG ................................................................................18,000 ft

## ALL OPERATIONS

### ICING LIMITATIONS

The aircraft has been approved for operation within the icing envelope defined by 14 CFR Part 25, Appendix C. Conditions outside of the approved envelope may be identified by:

- Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice
- Inability of the protected areas (wing leading edge or engine inlet) to prevent ice buildup (following normal warm-up time) or unusually extensive ice accretes on the wing or engine nacelle aft of the protected area
- Erratic air data and angle of attack indications
- Inability of the windshield heat system to keep the inboard zones free of ice
- Performance losses larger than normally encountered in icing conditions
- Frequent autopilot retrimming or mistrim alerts during straight and level flight
- Unusual control force or control deflection or uncommanded control movement or unusual lateral trim requirements
- Moderate to severe aircraft buffet

Supercooled cloud environment and freezing rain, freezing drizzle, or mixed conditions have not been tested. Operation in these conditions is prohibited. These icing environmental conditions are outside the icing envelope of 14 CFR Part 25, Appendix C, and may exceed the capabilities of the ice protection system, and may result in a serious degradation of performance or handling characteristics.

**ICING LIMITATIONS** (continued)

For operations in known or forecast icing, the airplane must be operated with its ice protection systems used as described in OPERATING IN ICING CONDITIONS (Section 4 – Normal Procedures). Where specific operational speeds and performance information have been established for such conditions, this information must be used.

**Ground Operations**

Engine anti-ice must be ON in ground icing conditions.

A visual and tactile check of the wing leading edge and wing upper surfaces is required prior to takeoff in ground icing conditions.

Ground icing conditions are defined as outside air temperature of 5 °C (41 °F) or less, or either L or R wing fuel temperature cannot be determined to be above 0 °C (32 °F) and:

- Visible moisture (rain, drizzle, sleet, snow, fog, etc.) is present; or
- The airplane was exposed to visible moisture (rain, drizzle, sleet, snow, fog, etc.) since the previous landing; or
- The difference between the dew point and the outside air temperature is 3 °C (5 °F) or less; or
- The airplane was exposed to atmospheric conditions conducive to formation of frost; or
- Water is present on the wing

**ICING LIMITATIONS** (continued)

Takeoff is prohibited with any ice, snow, slush, or frost (including polished frost) adhering on aircraft critical areas. Aircraft critical areas are defined as:

- Wing and winglet surfaces
- Horizontal and vertical stabilizer
- Flaps and control surfaces
- Engine inlets and pylons
- Air data probes
- Windshield
- Fuel vents
- Landing Gear

Wing anti-ice must be ON for takeoff in ground icing conditions. Thrust settings above that used for normal taxi are prohibited for ground operations with the wing anti-ice on.

Ground deicing/anti-icing operations are limited to Type I, II de-icing fluids and Type IV anti-icing fluids. Refer to TAKEOFF – ANTI-ICE FLUID PERFORMANCE ADDITIVES (Section 5 – Performance) for increased takeoff speeds and distances, if Type II or IV fluids are used.

## ICING LIMITATIONS (continued)

### Flight Operations

Engine anti-ice must be ON for flight in visible moisture when SAT is 5 °C (41 °F) to -40 °C (-40 °F).

Wing anti-ice must be NORM for all operations, except wing anti-ice must be ON for takeoff in icing conditions and flight above FL 340 in icing conditions. Inflight operation of wing anti-ice should not be necessary at temperatures below -40°C, but the wing anti-ice switch must remain in NORM.

Use of autopilot is prohibited in conditions exceeding the approved icing envelope defined by 14 CFR Part 25, Appendix C.

Minimum thrust setting when wing anti-ice is operating is 62% $N_1$. Thrust settings as low as 50% $N_1$ are allowed if required for descent or deceleration, but these thrust reductions must be limited to less than 5 minutes.

Minimum speed in icing conditions is 180 KIAS except as required for takeoff, approach and landing.

Flaps and landing gear must remain retracted in icing conditions except as required for takeoff, approach and landing.

Retraction of flaps to UP is prohibited following an icing encounter with flaps extended until the flaps can be confirmed free of ice, except as required for normal takeoff.

Extension of flaps to LDG is prohibited following an icing encounter unless the airframe can be confirmed free of ice.

The wing ice inspection lights must be operable prior to flight into known or forecast icing at night.

# AVIONICS / AFCS LIMITS

## GENERAL

The installed Garmin G3000™ system complies with AC 20-138D for IFR navigation using GPS for enroute, terminal area, and approach operations under the conditions described in the Navigation Operational Capabilities section. The Global Navigational Satellite System (GNSS) has been approved per TSO-C115c and TSO-146c.

## NAVIGATION OPERATIONAL CAPABILITIES

The *G3000* system must use at least software version Honda HA-420 System 1792.09 as the minimum version. The aircraft must have other operational, approved navigation equipment installed appropriate to the operation.

The *G3000* Integrated Avionics System Cockpit Reference Guide, P/N 190-01490-01 Rev B, dated September 2016 (or later appropriate revision) must be immediately available to the flight crew whenever navigation is predicated on the use of the system.

When using the *G3000* VNAV system, the barometric altimeter must be used as the primary altitude reference for all operations; including instrument approach procedure step-down fixes.

The navigation equipment as installed has been found to comply with the requirements established for the following navigation specifications. This does not constitute an operational approval.

GNSS FDE availability, where required per the following table, must be verified using the Garmin WFDE Prediction Program, part number 006-A0154-01 (010-G1000-00) or later.

## NAVIGATION OPERATIONAL CAPABILITIES (continued)

| **Navigation Specification** | **Operational Requirements/ Authorizations** | **Required Equipment** | **Reference Guidance** |
|---|---|---|---|
| Oceanic and Remote Areas of Operation (Class II Navigation) | GNSS FDE availability must be verified prior to flight. | Two Avionics Computer systems, operating and receiving usable navigation information from each of the dual GNSS sensors (or one navigation system and one GNSS sensor for those routes requiring only one long range navigation sensor). | Meets the applicable requirements of AC20-138D,<br>AC90-100A, AC91-70A,<br>FAA Order 8400.33. |
| North Atlantic Tracks (NAT)<br>Minimum Navigation Performance Specifications (MNPS) | GNSS FDE availability must be verified prior to flight. | Two Avionics Computer systems, operating and receiving usable navigation information from each of the dual GNSS sensors (or one FMS and one GNSS sensor for those routes requiring only one long range navigation sensor). | Meets the applicable requirements of AC20-138D,<br>AC91-70A. |

## NAVIGATION OPERATIONAL CAPABILITIES (continued)

| Navigation Specification | Operational Requirements/ Authorizations | Required Equipment | Reference Guidance |
|---|---|---|---|
| RNAV-10<br>RNP-10 | GNSS FDE availability must be verified prior to flight. | Two Avionics Computer systems, operating and receiving usable navigation information from each of the dual GNSS sensors. | Meets the applicable requirements of AC20-138D<br>FAA Order 8400.12C. |
| B-RNAV/<br>RNAV-5<br>RNP-5 | EPU/ANP does not exceed RNP. | At least one Avionics Computer system is receiving usable navigation information from the GNSS sensor. | Meets the applicable requirements of AC20-138D,<br>AC90-96A,<br>AC90-100A, EASA AMC 20-4. |
| RNP-4 Oceanic and Remote Area Operations | GNSS FDE availability must be verified prior to flight.<br>EPU/ANP does not exceed RNP. | Two Avionics Computer navigation systems, operating and receiving usable navigation information from each of the dual GNSS sensors. | Meets the applicable requirements of AC20-138D,<br>FAA Order 8400.33. |

## NAVIGATION OPERATIONAL CAPABILITIES (continued)

| **Navigation Specification** | **Operational Requirements/ Authorizations** | **Required Equipment** | **Reference Guidance** |
|---|---|---|---|
| RNAV-2<br>RNAV-1<br>P-RNAV<br>RNAV Routes (DPs, STARS, Q and T Routes)<br>RNP-2<br>RNP-1 | GNSS is required for takeoff in P-RNAV airspace.<br>GNSS FDE availability must be verified prior to flight for DPs that require GNSS.<br>EPU/ANP does not exceed RNP. | At least one Avionics Computer system is receiving usable navigation information from one or more GNSS sensor (required for takeoff in P-RNAV airspace and some DPs). | Meets the applicable requirements of<br>AC20-138D,<br>AC90-105,<br>AC90-96A,<br>AC90-100A, JAA TGL 10. |
| RNP-APCH [titled RNAV (GPS) or RNAV (GNSS)]<br>-including RNP procedures to a minimum value of RNP-0.3 (LNAV or LPV minimums).<br>RNP AR-APCH procedures, and approach procedures with RF legs are NOT authorized. | All instrument approach procedures that are retrieved from the navigation system database are authorized.<br>GNSS is required to initiate RNAV (GPS) approach procedures.<br>For RNAV (GPS) approach procedures, a missed approach is required if both GNSS sensors become unavailable. | At least one Avionics Computer system is receiving usable navigation information from a GNSS sensor (required for RNAV (GPS) approach procedures). | Meets the applicable requirements of AC20-138D,<br>AC90-105,<br>EASA AMC 20-27. |

## NAVIGATION OPERATIONAL CAPABILITIES (continued)

| **Navigation Specification** | **Operational Requirements/ Authorizations** | **Required Equipment** | **Reference Guidance** |
|---|---|---|---|
| | EPU/ANP does not exceed RNP (except during a missed approach procedure following loss of GNSS navigation).<br><br>Maximum predicted RAIM outage is 5 minutes.<br><br>For ILS, LOC, LOC-BC, LDA, and SDF approach procedures, the active navigation source must be LOC or BC (green needles) prior to crossing the final approach fix. | | |
| Enroute, Terminal and Approach Vertical Navigation (VNAV) | Use of Vertical Glidepath (GP) guidance to a published DA is approved. | The selected navigation system is receiving usable information for a baro-VNAV (or SBAS, if applicable) solution. | Meets the applicable requirements of<br><br>AC20-138D, AC90-100A, AC90-105,<br><br>EASA AMC 20-27. |

## NAVIGATION OPERATIONAL CAPABILITIES (continued)

The following Advanced RNP functions are supported:

- Parallel Offsets
- RNAV Holding
- Fixed Radius Transitions (FRT)

The following Advanced RNP functions are not supported:

- Radius to a Fix (RF Legs)
- Scalable RNP
- Time of Arrival Control (TOAC)

## VOR NAVIGATION

VHF NAV must not be used as the primary means of navigation beyond 100 nm from the VOR station.

## SAFETAXI

The SafeTaxi airport moving map display (AMMD) functionality with own-ship position symbol is designed to assist flight crews in orienting themselves on the airport surface to improve pilot positional awareness during taxi and flight operations. Do not use the AMMD function as the basis for ground maneuvering. SafeTaxi is limited to ground operations only.

## WEATHER RADAR

Do not operate the weather radar on the ground in close proximity to ground crew. All personnel must remain beyond the safe operating zone which is 11 feet (3.4 meters) from the antenna.

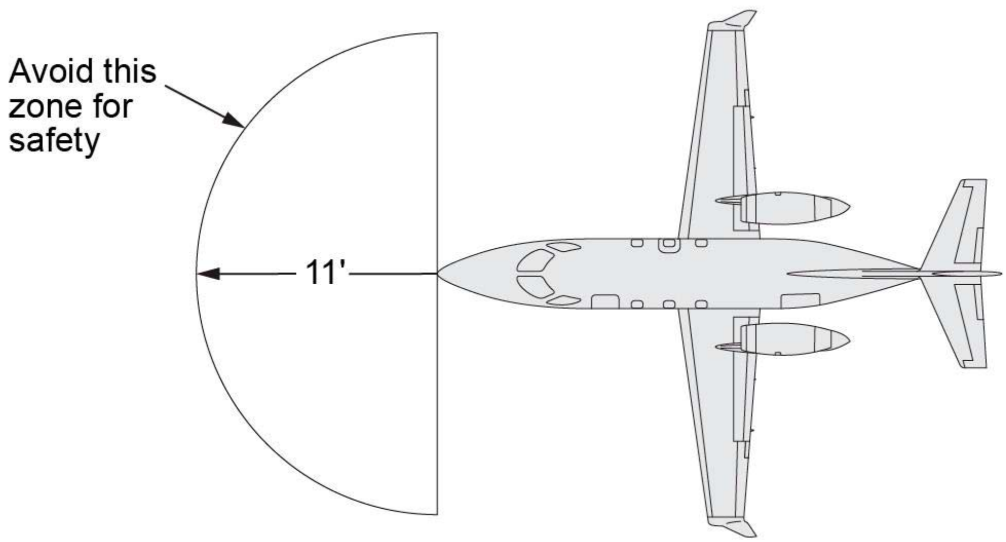


**Figure 5. Safe Zone for Weather Radar Operation**

## ATTITUDE AND HEADING REFERENCE SYSTEM (AHRS)

Operation in the following regions is not authorized due to unsuitability of the magnetic fields near the Earth's poles:

- 1) North of 72° North latitude at all longitudes
- 2) South of 70° South latitude at all longitudes
- 3) North of 65° North latitude between longitude 75° W and 120° W. (Northern Canada)
- 4) North of 70° North latitude between longitude 70° W and 128° W. (Northern Canada)
- 5) North of 70° North latitude between longitude 85° E and 114° E. (Northern Russia)
- 6) South of 55° South latitude between longitude 120° E and 165° E. (Region south of Australia and New Zealand)

## SYNTHETIC VISION SYSTEM

Navigation must not be predicated upon the use of the Synthetic Vision System display.

**NOTE** The synthetic vision system may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles.

## TRAFFIC COLLISION AVOIDANCE SYSTEM (TCAS)

Pilots are authorized to deviate from their current Air Traffic Control (ATC) clearance to comply with a TCAS II resolution advisory (RA).

Maneuvers based solely on a traffic advisory (TA) or on information displayed on the traffic display are not authorized.

## TERRAIN AWARENESS AND WARNING SYSTEM (TAWS)

Navigation or terrain clearance must not be predicated upon the use of the TAWS.

**NOTE** The terrain display is intended to serve as a situational awareness tool only. It may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles.

## VERTICAL SITUATION DISPLAY

Navigation or terrain clearance must not be predicated upon the use of the Vertical Situation Display.

## ELECTRONIC CHECKLIST

The Electronic Checklist must not be edited without the appropriate certification and/or operational approval from the applicable competent authority.

## CONTROLLER-PILOT DATA LINK COMMUNICATIONS (CPDLC)

The installed CPDLC system is fully compliant with the requirements of CS ACNS.B.DLS (Data Link Services). Compliance with the above does not constitute an operational approval.

## AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B)

The installed ADS-B Out system has been demonstrated to meet the equipment requirements of 14 CFR 91.225 and 91.227. The installed ADS-B Out system is fully compliant with the requirements of CS ACNS.D.ADSB (1090 MHz Extended Squitter ADS-B Out). Compliance with the above does not constitute an operational approval.

## TRANSPONDER

The installed transponder system is able to respond to interrogations in Modes A, C and S and is fully compliant with the requirements of CS ACNS.D.ELS/EHS (Mode S Elementary/Enhanced Surveillance).

## AUTOPILOT

In order to prevent a mistrim condition, do not manually override the autopilot.

Minimum Use Heights:

- Climb, Enroute, or Descent: 500 ft AGL
- Approach:
    - Visual and Non-precision: 200 ft AGL
    - Precision: 100 ft AGL

## YAW DAMPER

The Yaw Damper must be disengaged for taxi, takeoff, and landing.

The Yaw Damper must be engaged in flight except as required for takeoff and landing.

Minimum Use Height

- 50 ft AGL

# ELECTRICAL SYSTEM LIMITS

## GENERATOR LIMITS

All Operations ........................................ 325 amps (continuous) each

**NOTE** The GCU will automatically trip offline due to an overcurrent. The trip point varies based on the amount of overcurrent and duration. A GCU trip is imminent anytime **GENERATOR OVERLOAD** is posted.

## EXTERNAL POWER LIMITS

External power cart minimum voltage is 27.0 Volts DC (VDC). The power cart must be capable of generating a minimum of 1,000 amps momentarily and 300 amps continuously.

## BATTERY LIMITS FOR GROUND STARTS

Minimum battery voltage for start ...................................... 23.5 volts

Minimum battery cold-soak temperature ...................................-20 °C

**NOTE** If the batteries have been cold-soaked as defined in Cold Weather Operations (Section 4 – Normal Procedures), engine start is permitted to 22.5 volts.

# ENVIRONMENTAL / PRESSURIZATION LIMITS

## ALTITUDE LIMITS FOR DEGRADED OPERATIONS

Maximum Pressure Altitude

during single engine bleed operations ..................................... 25,000 ft

Maximum Pressure Altitude

during single cabin inflow operations ..................................... 25,000 ft

## CABIN PRESSURIZATION LIMITS

Maximum Differential Pressure ................................................ 9.0 psid

Maximum Differential Pressure for Landing ............................ 0.3 psid

## GROUND COOLING MODE

Operation with Ground Cooling Mode enabled is prohibited during taxi or flight.

# FUEL SYSTEM LIMITS

## APPROVED FUELS

| Description | Specification |
| --- | --- |
| Jet A | ASTM-D 1655 |
| Jet A-1 (AVTUR) | ASTM-D1655<br>(DEF STAN 91-91) |
| JP-8 | MIL-DTL-83133 |
| PRC No. 3 Jet Fuel | GB6537-2006 (1) |

**NOTES:**

(1) See the Prohibited Fuels Additives section

## MINIMUM/MAXIMUM FUEL TEMPERATURE

-40 °C / 60 °C

## MAXIMUM FUEL IMBALANCE

All Operations ..........................................................................100 lbs

## APPROVED FUEL ADDITIVES

Fuel biocide SOHIO Biobor JF additive is approved at a concentration not to exceed 20 ppm (270 ppm total additive) of elemental boron.

- Shock Treatment (Max) (270 PPM) = 2.6 Fl Oz/100 Gal of Jet Fuel
- Maintenance Level (135 PPM) = 1.3 Fl Oz/100 Gal of Jet Fuel

Fuel Static Dissipator Dupont Stadis 450 anti-static additive or equivalent is approved to bring fuel up to 300 conductive units, but must not exceed 1 part per million (ppm).

- 0.5-3.0 mg/l or 0.189-1.135g/100 Gal of Jet Fuel

Fuel icing inhibitors (FSII) meeting specification MIL-DTL-27686 (EGME) or MIL-DTL-85470 (DiEGME) are approved in amounts not more than 0.15% by volume.

- 0.15 Gal/100 Gal or 0.6 Qts/100 Gal or 19.2 Oz/100 Gal

**NOTE** If used, the icing inhibitor must be well blended into the fuel and not poured or splash-blended into the fuel tank. The icing inhibitor must be added either by an injector system on the fuel unit (truck or stand) or by injection into the fuel stream at the re-fuel port using aerosol cans.

## PROHIBITED FUEL ADDITIVES

The following additives defined in GB6537-2006 are not approved for use:

- T1502 Antistatic Agent
- T1601 Anti-Wear Agent (Corrosion Inhibitor/Lubricity Improver)
- T1602 Anti-Wear Agent (Corrosion Inhibitor/Lubricity Improver)

# HYDRAULIC SYSTEM LIMITS

## APPROVED HYDRAULIC FLUID

Approved Hydraulic Fluid.............................................. MIL-PRF-87257

# MISCELLANEOUS SYSTEM LIMITS

Oxygen supply must be adequate for the intended flight.

Each pilot's onside audio speaker must be on if headsets are not worn.

The cockpit and cabin must have been warmed to at least -15 °C prior to takeoff if the aircraft has been cold-soaked, as defined in Cold Weather Operations (Section 4 – Normal Procedures).

Crew and passenger oxygen masks are not approved for use above 40,000 ft cabin altitude. Prolonged operation of passenger masks above 25,000 ft cabin altitude is not approved.

Only the cabin wireless system may be used to provide airborne access services (Internet/World Wide Web) to the aircraft's cabin passengers with access via portable electronic devices (PEDs). Use of cell phones for this purpose (other than through 802.11 b/g WiFi) is prohibited.

Maintenance personnel must use the Cabin Telecommunications Router Configuration Page during ground operations only. Use of this page at other times is prohibited.

# PLACARDS

Placards remind the flight crew and passengers of certain types of equipment and safety devices.

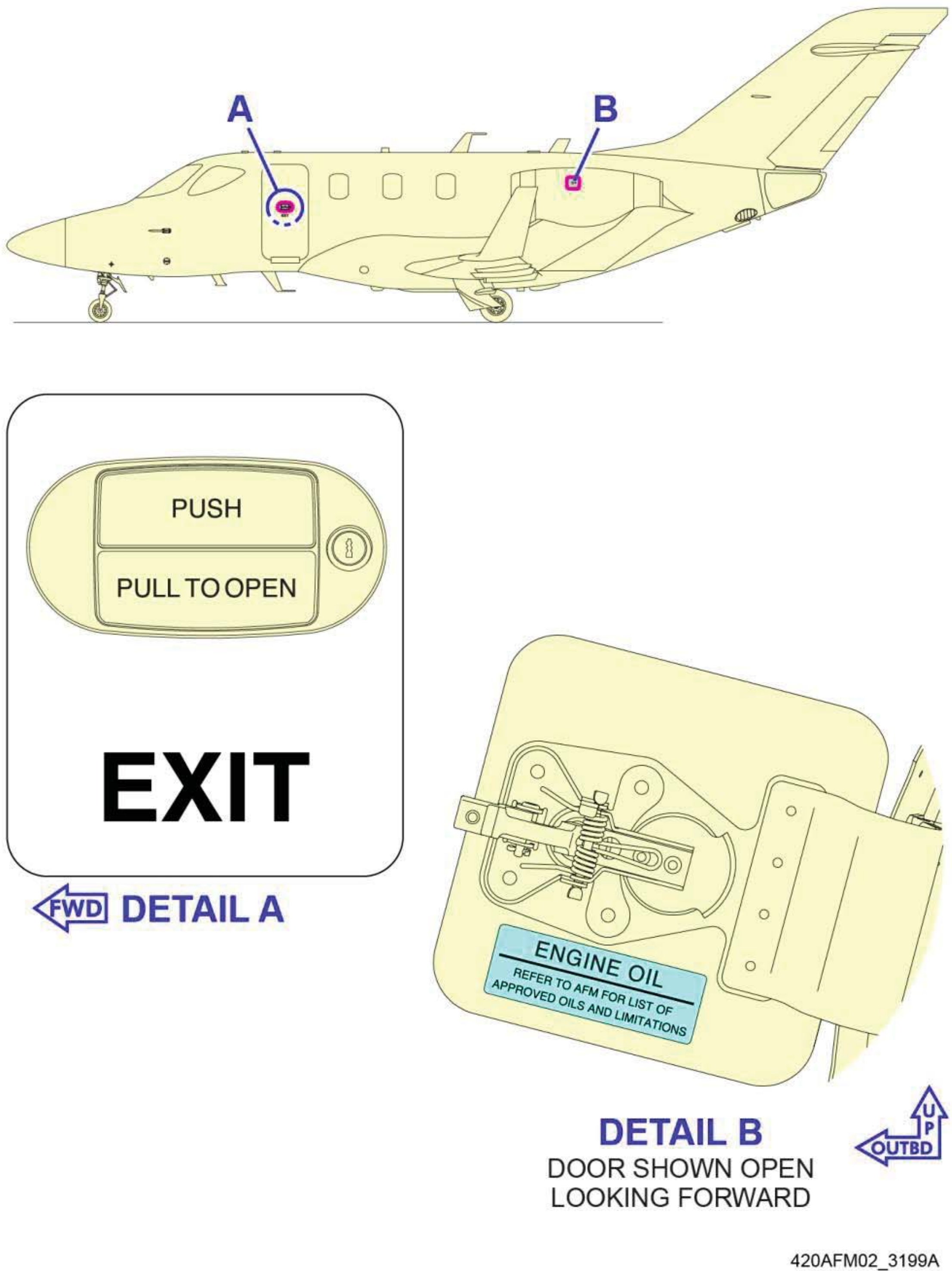


**Figure 6. Exterior Placards**

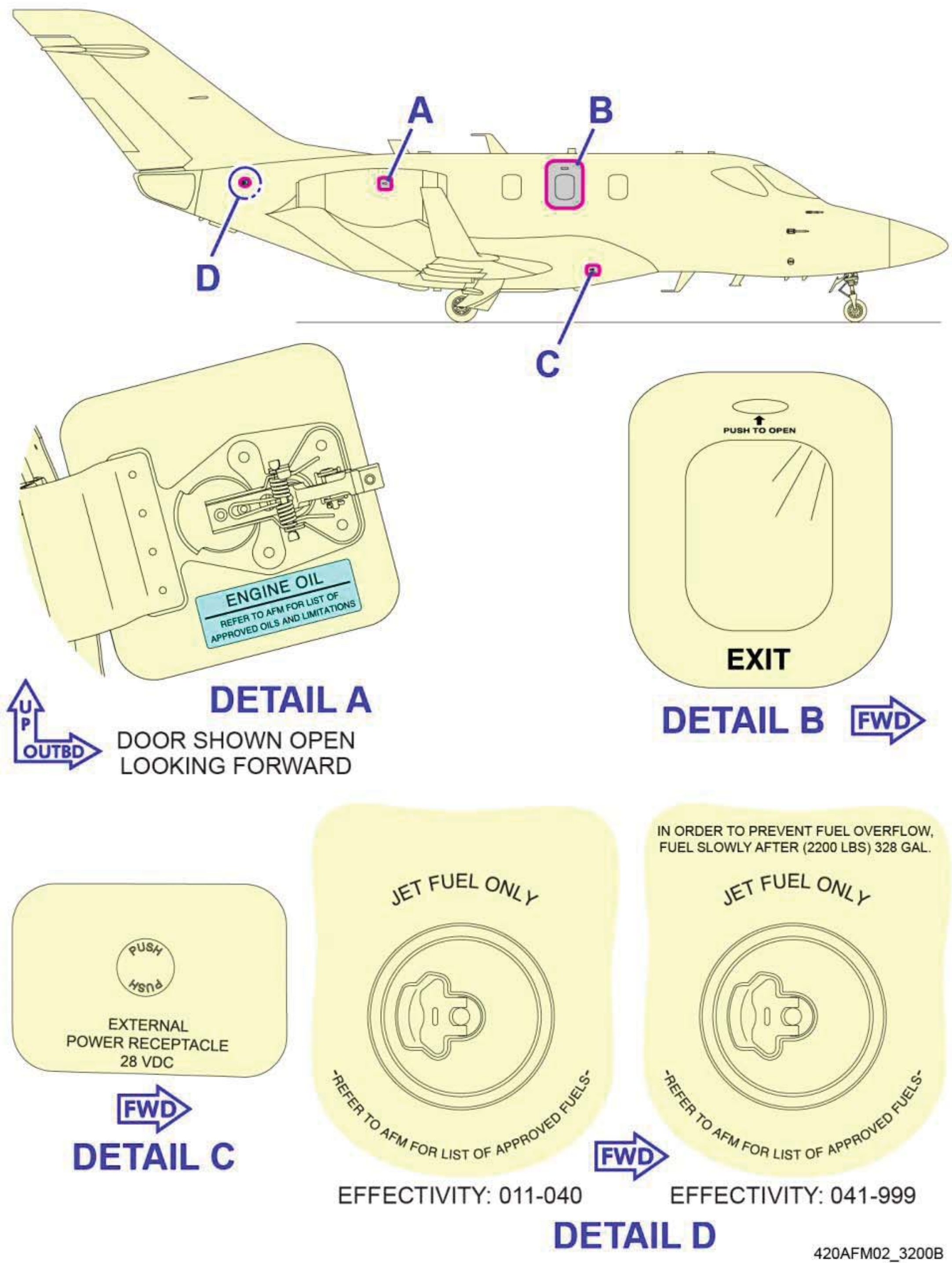


**Figure 7. Exterior Placards**

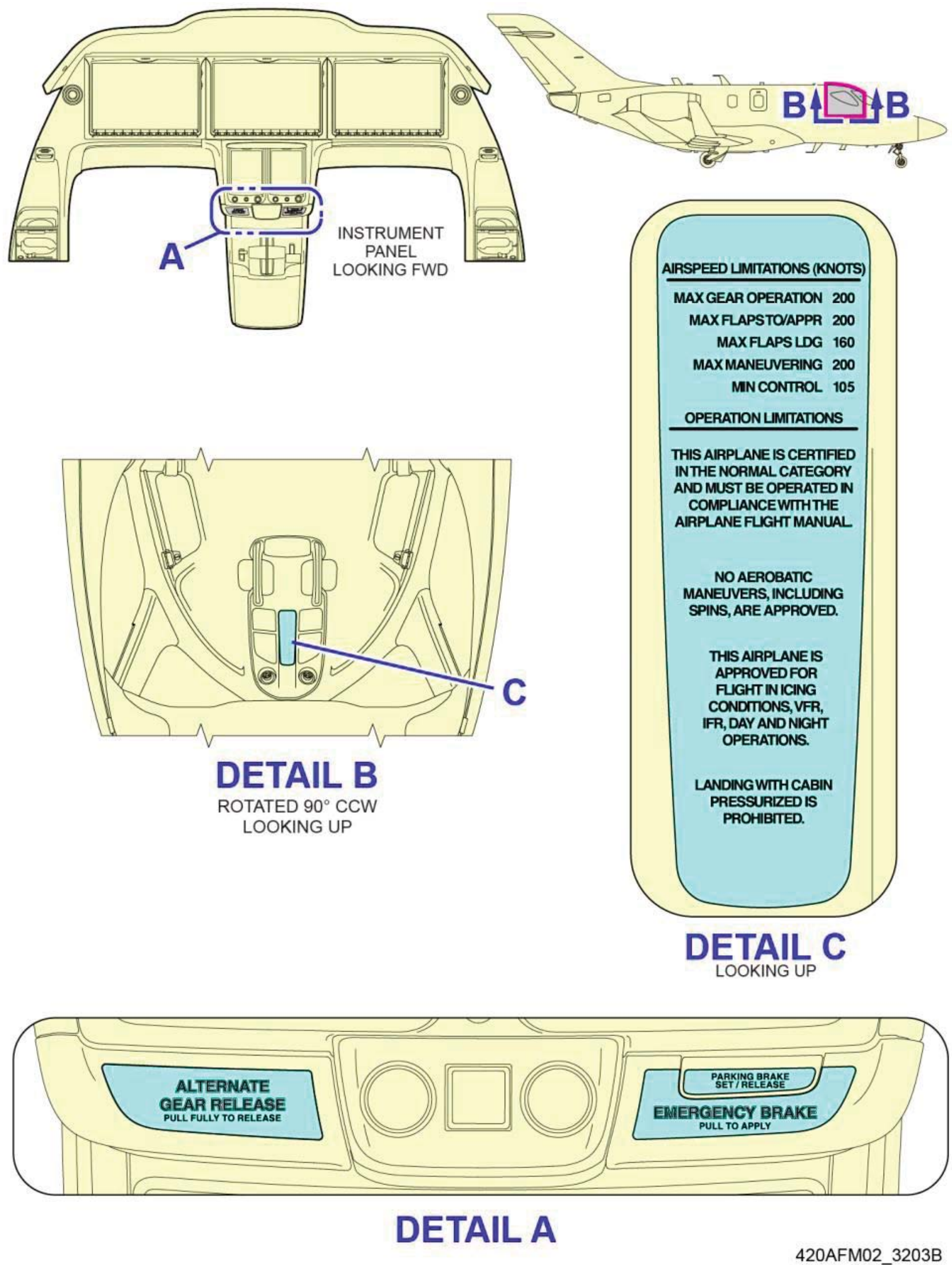


**Figure 8. Interior Placards**

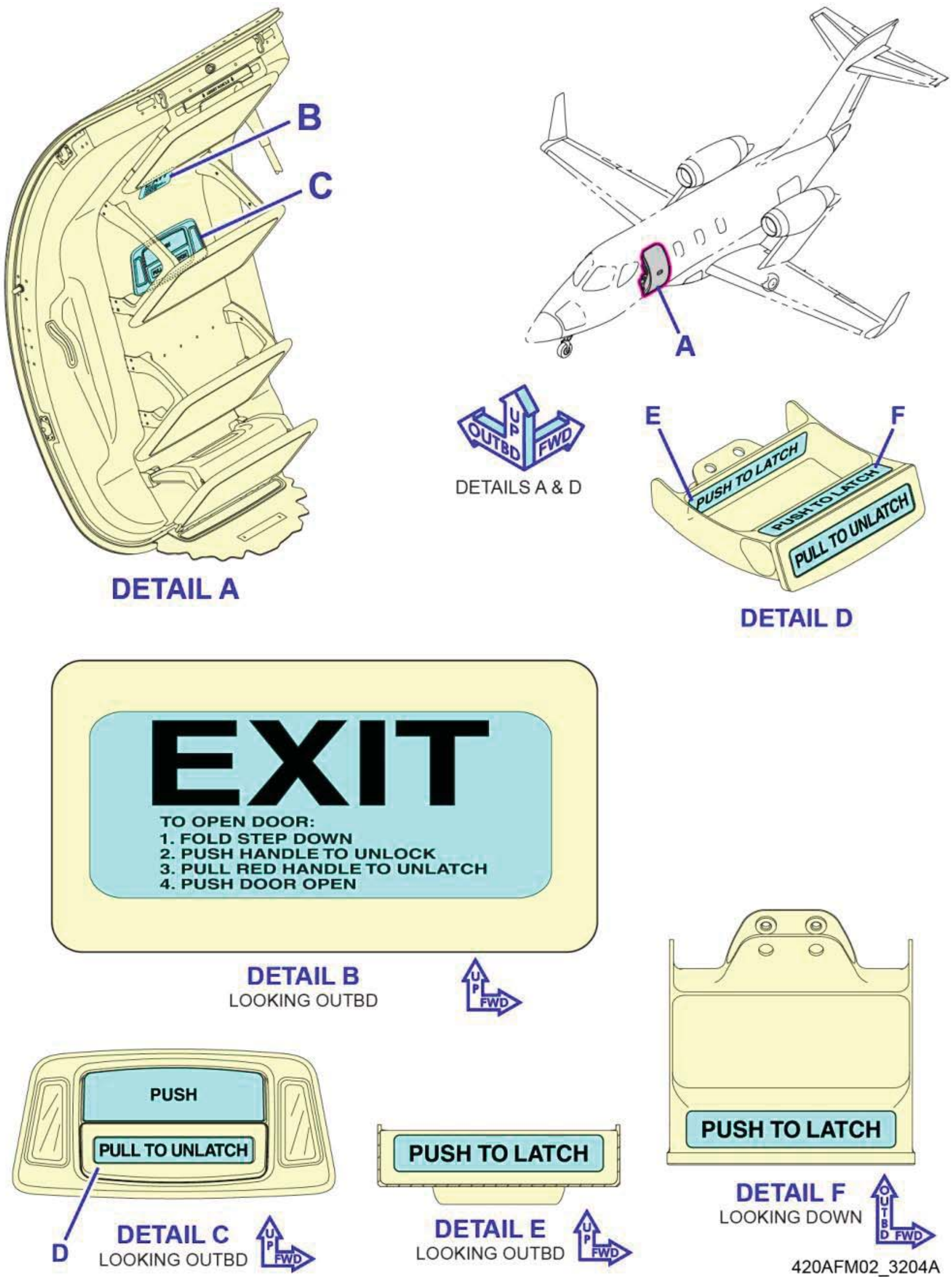


**Figure 9. Interior Placards**

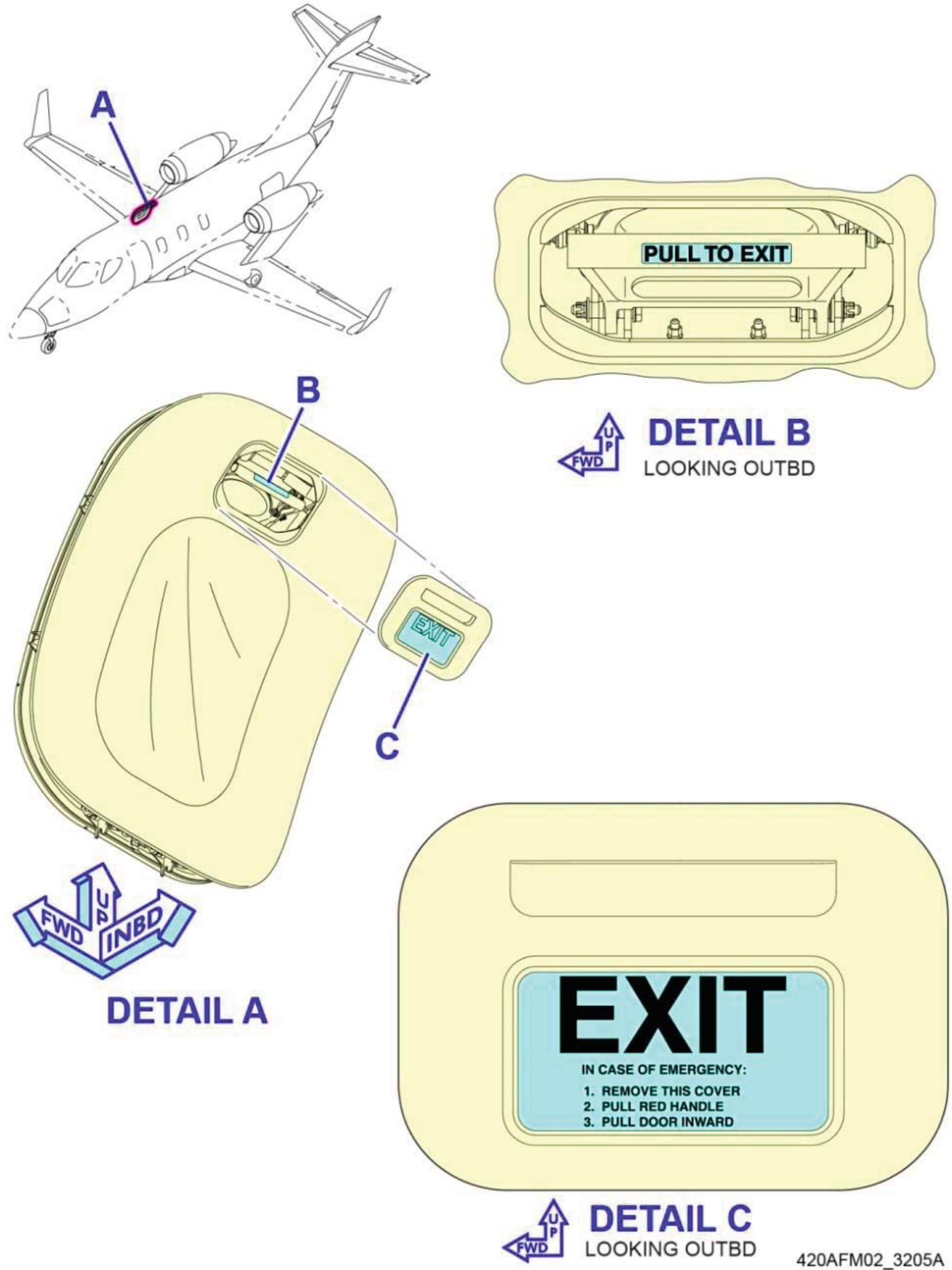


**Figure 10. Interior Placards**

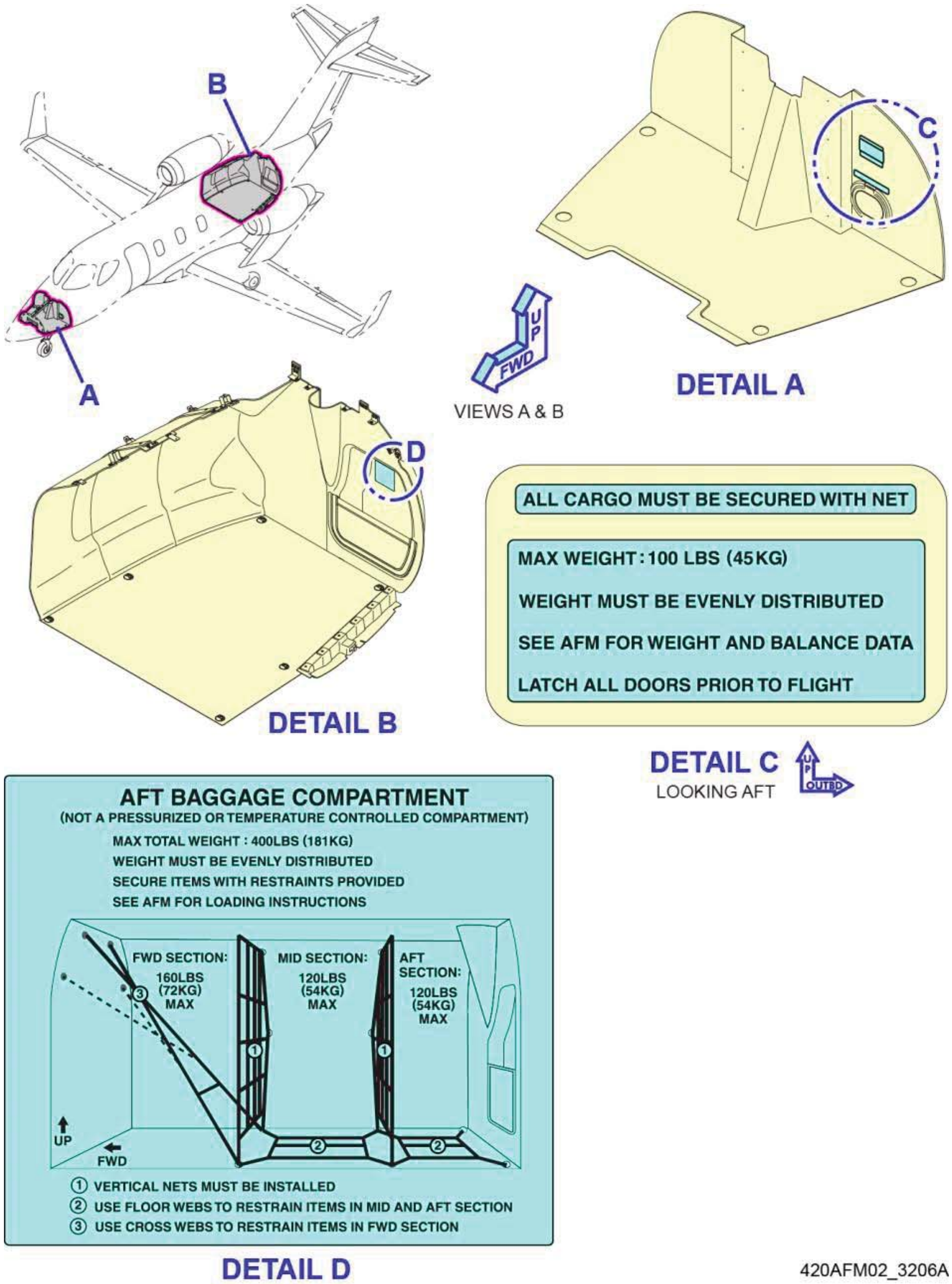


**Figure 11. Interior Placards**

# SECTION 3

# EMERGENCY PROCEDURES

## CAS INDEX

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## SECTION 3

# EMERGENCY PROCEDURES

## TABLE OF CONTENTS

LANDING GEAR AND BRAKES



SMOKE OR FIRE



OPERATIONAL

# EMERGENCY PROCEDURES

## GENERAL

The procedures contained in this section have been developed by the manufacturer and approved by the certifying agency to provide a means to protect the occupants and the aircraft from harm during a critical situation requiring immediate response. Immediate actions which should be accomplished without reference to this manual are delineated by bold text within a red box.

Emergency procedures are grouped by functional system. Within each functional system area, the procedures are sorted by non-CAS procedures, CAS based, and other visual indications such as PFD flags. Each sub-group is sorted by alphabetical order.

Certain failures are capable of compromising multiple airplane systems. The pilot must respond directly to each annunciated or otherwise identified system failure and consult the AFM for each specific Abnormal or Emergency procedure. For cases where multiple procedures specify different airplane configurations for continued safe flight and landing, the most restrictive must be used. If multiple procedures specify additional landing distance factors, each factor is additive and applied to the normal landing distance.

Some more complex emergency procedures have significant impact to the actions required to be followed during approach and landing. In these cases the emergency procedure has been written to incorporate all applicable normal procedure steps and allow the crew to use the single checklist all the way through landing.

Procedures are for use in flight unless other conditions are specifically called out. If not specifically addressed, while on the ground conditions addressed in this section must be corrected prior to flight, unless dispatch

is allowed by an approved MEL or otherwise authorized by the appropriate aviation authority.

## TERMINOLOGY

Sound judgment, a thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential for handling any emergency situation. Some emergencies may compromise airworthiness or functionality, and therefore, the terms "land at nearest suitable airport" or "land as soon as possible" may be used which are defined as:

**Land at nearest suitable airport** – the mission should be terminated, and the aircraft landed at a suitable airfield. The airfield and duration of the flight is left to the aircrew's discretion based on their specific circumstances. Considerations should include (but are not limited to):

- Severity of the emergency
- Aircraft performance
- Field facilities
- Weather
- Ambient conditions such as lighting
- Degraded aircraft functionality

**Land as soon as possible** – the mission should be terminated, and the aircraft landed as soon as possible. The same considerations apply when selecting a suitable airfield, but this term is used when prolonged flight is not recommended.

# ELECTRICAL SYSTEM

## ELEC EMER POWER

*Both generators are off-line in the air, or on the ground with both engines running*

1. **GENERATORS (one at a time)............. OFF, then NORM**

**NOTE** During ground operations, $N_2$ may need to be increased above 55% on the associated engine prior to cycling the generator switch to reset the generator.

***If only one generator comes on***

2. GENERATOR (inoperative side)..................................... OFF
3. Accomplish L(R) GENERATOR FAIL (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If neither generator comes on***

2. GENERATOR......................................................... Both OFF

┌ **Procedure Continued** ┐

ELEC EMER POWER (continued)

**NOTE** The Cockpit Flood light may be used to provide cockpit illumination at night when operating on Emergency Power.

3. Accomplish OPERATION WITH EMERGENCY POWER ONLY (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

# ENGINES

## L(R) ENG EXCEEDANCE

*An exceedance of $N_1$, ITT, $N_2$, oil pressure, or oil temperature has been detected*

1. **Thrust Lever (affected engine) .................................. Retard**

2. Engine Indications .................................. Monitor within limits

***If engine parameters cannot be maintained within limits***

3. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENGINE FLAMEOUT

*An un-commanded $N_2$ deceleration of the associated engine has been detected*

### DURING TAKEOFF (BELOW $V_1$ – TAKEOFF ABORTED)

1. Accomplish REJECTED TAKEOFF (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

### DURING TAKEOFF (ABOVE $V_1$ – TAKEOFF CONTINUED)

1. Pitch Attitude.......................... Flaps TO/APPR - 10° Nose Up
   Flaps UP - 11° Nose Up

**NOTE** Flight Director TO mode pitch targets are automatically adjusted for flap position and engine failure.

2. Landing Gear (positive rate of climb) ................................ UP
3. Airspeed............................................................ Maintain $V_2$
4. Trim ......................................................................As required
5. Airspeed (1500 ft AGL or clear of obstacles) ......... Accelerate to $V_2 + 10$

┌ **Procedure Continued** ┐

**L(R) ENGINE FLAMEOUT** (continued)

6. FLAPS .......................................................................... UP
7. Airspeed.............................................Accelerate to 140 KIAS
8. Continue planned takeoff flight path
9. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

**DURING FLIGHT**

1. Thrust Lever (affected engine) ........................................ IDLE

**NOTE** Successful engine relight is indicated by steady increase of ITT and $N_2$ within 10 seconds.

***If engine relights within 10 seconds***

2. Thrust Lever (affected engine) .............. As required following Stabilized idle

--- END OF PROCEDURE ---

┌ **Procedure Continued** ┐

**L(R) ENGINE FLAMEOUT** (continued)

***If engine does not relight within 10 seconds***

2. Thrust Lever (affected engine) ................................ CUT OFF

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

3. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L-R ENGINE FLAMEOUT

*An un-commanded $N_2$ deceleration of both engines has been detected*

1. Thrust Levers................................................................ IDLE

**NOTE** Successful engine relight is indicated by steady increase of ITT and $N_2$ within 10 seconds.

***If one or both engines automatically relights within 10 seconds***

2. Thrust Lever (affected engine) .............. As required following Stabilized idle
3. Accomplish L(R) ENGINE FLAMEOUT (Section 3 – Emergency Procedures) if required

--- END OF PROCEDURE ---

***If neither engine automatically relights within 10 seconds***

2. Thrust Levers........................................................CUT OFF
3. Airspeed................................................ 140 KIAS Minimum

┌ **Procedure Continued** ┐

**L-R ENGINE FLAMEOUT** (continued)

***CAUTION*** *To minimize the risk of rotor lock*:

- *Maintain airspeed above 140 KIAS to ensure core rotation.*
- *Following commanded or uncommanded inflight shutdown, maintain positive core rotation throughout the engine-out scenario. If core rotation has stopped, take action to achieve core rotation as soon as practical. Failure to maintain positive core rotation may preclude a successful start.*

4. Altitude............................................ Descend below 30,000 ft
5. Accomplish ENGINE AIRSTART (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG OIL PRESS LOW

*Engine oil pressure is below the minimum limit*

1. Oil Pressure Indication (affected engine) .................... Monitor

**NOTE** Aircraft negative-g maneuvers can cause temporary oil supply interruption resulting in low oil pressure indications (below redline) and an **ENG OIL PRESS LOW** message. Engine operations below the oil pressure limits are permitted for a maximum of 15 seconds before engine shutdown is required.

***If ENG OIL PRESS LOW message remains***

2. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG VIBRATION HIGH

*Excessive engine vibration has been detected*

1. Thrust Lever (affected engine) ................ Slowly reduce thrust

**NOTE** If icing conditions were encountered, cycling Thrust Lever between IDLE and MCT may reduce engine vibration due to ice accumulation.

***If vibration condition remains***

2. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

# ENVIRONMENTAL / PRESSURIZATION SYSTEMS

## CABIN ΔP HIGH

*Cabin differential pressure has exceeded 9.2 psid*

1. Oxygen Masks ........................................................DON
2. Crew Communications ..........................................Establish

**NOTE** Crew communications can be established by use of headsets, selecting cockpit speakers ON, or selecting the OXY MASK AUDIO switch to EMER.

3. CABIN INFLOW ..............................................L or R OFF
4. Altitude.....................................Descend to FL 250 or below
5. Land at nearest suitable airport

***If cabin differential pressure remains high***

6. Cycle remaining CABIN INFLOW between OFF and NORM as required to maintain differential pressure below 9.0 psid

┌ **Procedure Continued** ┐

CABIN ΔP HIGH (continued)

***If cabin differential pressure remains high***

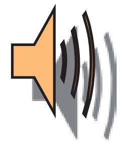
7. CABIN DUMP ........................................................... DUMP
8. CABIN OXYGEN ........................................... DROP MASK
9. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher

***If cabin differential pressure remains high***

10. CABIN INFLOW .................................................... Both OFF

--- END OF PROCEDURE ---

## CABIN ALT HIGH



***"CABIN ALTITUDE"***

*Cabin altitude has exceeded 10,000 ft (15,000 ft in High Field Mode)*

1. **Oxygen Masks............................................................. DON**
2. **OXY MASK AUDIO............................................... EMER**

**NOTE** "Cabin Altitude" aural alert will repeat every 30 seconds after acknowledgement via the Master Warning Switch.

**NOTE** If the airplane is above 25,000 ft MSL and the autopilot is engaged, it will automatically enter Emergency Descent Mode (EDM) when the CABIN ALT HIGH warning posts.

***If cabin altitude is greater than 15,000 ft***

3. Accomplish EMERGENCY DESCENT (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

## L(R) CABIN BLEED LEAK

*A leak has been detected in cabin bleed air system*

1. **CABIN INFLOW (affected side)................................... OFF**
2. Altitude.......................................Descend to FL 250 or below
3. Land at nearest suitable airport

***If CABIN BLEED LEAK message remains***

4. ENGINE BLEED (affected side) ......................................OFF
5. WING FLOW ............................. FROM R(L) (operable side)

***If CABIN BLEED LEAK message remains***

6. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG BLEED LEAK

*A leak has been detected in engine bleed air system or the engine anti-ice system*

1. **ENGINE BLEED (affected side)................................... OFF**

**CAUTION** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

2. Altitude.......................................Descend to FL 250 or below
3. WING FLOW ............................ FROM R(L) (operable side)
4. Land at nearest suitable airport

***If ENG BLEED LEAK message remains***

5. Icing Conditions ..........................................................Exit
6. ENGINE ANTI-ICE (affected engine)..............................OFF

┌ **Procedure Continued** ┐

**L(R) ENG BLEED LEAK** (continued)

***If ENG BLEED LEAK message remains***

7. WING ANTI-ICE ............................................................ OFF

***If ENG BLEED LEAK message remains***

8. Thrust Lever (affected engine) ........................................ IDLE

***If ENG BLEED LEAK message remains***

9. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## WING BLEED LEAK

*A leak has been detected in wing anti-ice system*

1. **WING ANTI-ICE ........................................................ OFF**

2. Icing conditions ............................................................Exit

***If WING BLEED LEAK message remains***

3. L ENGINE BLEED ........................................................OFF
4. Altitude.......................................Descend to FL 250 or below
5. Land at nearest suitable airport

***If WING BLEED LEAK message remains***

6. L ENGINE BLEED .................................................. NORM
7. R ENGINE BLEED ........................................................OFF

- ***If no icing conditions are encountered prior to landing***

8. Land using normal procedures

--- END OF PROCEDURE ---

┌ **Procedure Continued** ┐

**WING BLEED LEAK** (continued)

- ***If wing protected surfaces cannot be confirmed to be free of ice, or icing conditions are expected during approach or landing***

8. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

# FLIGHT CONTROLS

## FLIGHT CONTROL MALFUNCTION

*An unexpected aircraft or flight control motion has occurred whose cause is unknown*

1. **AFCS / TRIM MASTER............................. Press and Hold**
2. Airplane attitude ........................................................ Recover

***If pitch anomaly***

3. PITCH SERVO POWER ................................................ OFF
4. PITCH TRIM MODE.................................................... STBY
5. AFCS / TRIM MASTER............................................. Release
6. Adjust trim by use of the STANDBY PITCH switch
7. Yaw Damper............................................................. Engage
8. RVSM airspace..............................................................Exit
9. Land at nearest suitable airport

--- END OF PROCEDURE ---

***If roll anomaly***

3. ROLL SERVO POWER.................................................OFF

┌ **Procedure Continued** ┐

## FLIGHT CONTROL MALFUNCTION (continued)

4. ROLL TRIM POWER....................................................OFF
5. AFCS / TRIM MASTER............................................Release
6. Yaw Damper.............................................................. Engage
7. RVSM airspace.................................................................Exit
8. Land at nearest suitable airport

--- END OF PROCEDURE ---

***If yaw anomaly***

3. YAW SERVO POWER ...................................................OFF

**NOTE** The rudder bias system is inoperative. Rudder forces with one engine inoperative will increase.

4. YAW TRIM POWER.......................................................OFF
5. AFCS / TRIM MASTER............................................Release
6. Autopilot..................................................................As required

- ***If the autopilot is not available***

7. Altitude......................................................... FL 240 or lower
8. Land at nearest suitable airport

--- END OF PROCEDURE ---

# LANDING GEAR AND BRAKES

**LDG GEAR UNSAFE**

***"LANDING GEAR"***

*One or more landing gear is not safe for landing*

**NOTE** "Landing Gear" aural alert will repeat every 10 seconds after acknowledgement via the Master Warning Switch.

1. LANDING GEAR ............................................................DN
2. Landing Gear Indications ...........Verify gear down and locked (three green)

***If unsafe landing gear indications persist and both main gear are down and locked***

3. Accomplish ALTERNATE GEAR RELEASE EXTENSION (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If unsafe landing gear indications persist and only one main gear is down and locked***

3. LANDING GEAR ............................................................ UP
4. Accomplish ALTERNATE GEAR RELEASE EXTENSION (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## NORMAL BRAKES FAIL

*Normal wheel brakes have failed*

**1. EMERGENGY BRAKE ............................ Apply gradually**

***CAUTION*** *Anti-skid will not operate. Avoid cycling the brake handle. Approximately ten applications are available with a fully charged system.*

**NOTE** Gradually pull emergency brake handle until desired braking action is achieved.

**NOTE** Landing distance will increase by 50% on a dry runway and 100% on a wet runway.

--- END OF PROCEDURE ---

# SMOKE OR FIRE

## SMOKE OR FIRE

*Smoke or fire has been detected in the cockpit or cabin area*

1. **Oxygen Masks............................DON and 100% OXYGEN**
2. **Smoke Goggles........................................................... DON**
3. **OXY MASK AUDIO............................................... EMER**
4. **CABIN DUMP ...................................................... DUMP**

**NOTE** Attempt to identify the source of the smoke or fumes. Electrical smoke is generally gray or tan in color and irritating to the nose and eyes. Environmental system smoke is usually white in color and less irritating.

**NOTE** The oxygen mask microphone will be turned off if the OXY MASK AUDIO switch is returned from EMER to NORM. The oxygen mask microphone can be re-enabled through the AUDIO AND RADIOS page on the CDU.

5. CABIN OXYGEN................................................As required
6. Accomplish ELECTRICAL FIRE OR SMOKE or ENVIRONMENTAL SYSTEM SMOKE OR ODOR as appropriate (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

## ELECTRICAL FIRE OR SMOKE

*Fire or smoke has been determined to be caused electrically*

***If source is known:***

1. Faulty Equipment ............................................................Isolate

--- END OF PROCEDURE ---

***If source is not known:***

1. Generators ................................................................ Both OFF

**NOTE** The Cockpit Flood light may be used to provide cockpit illumination at night when operating on Emergency Power, or on #1 Buses Only.

- ***If smoke or fire decreases or ceases***

2. Accomplish OPERATION WITH EMERGENCY POWER ONLY (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

- ***If smoke or fire persists***

2. L GENERATOR ......................................................... NORM
3. BUS TIE ...............................................................................OPEN
4. BATTERY...............................................................................OFF

┌ **Procedure Continued** ┐

**ELECTRICAL FIRE OR SMOKE** (continued)

5. Left DISPLAY REVERSION ........................................ REV
6. Left PFD Sensors.......................................... AHRS 1, ADC 1

- ***If smoke or fire decreases or ceases***

7. Accomplish OPERATION WITH #1 BUSES ONLY (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

- ***If smoke or fire persists***

7. R GENERATOR ........................................................ NORM
8. Left PFD Sensors.......................................... AHRS 2, ADC 2
9. L GENERATOR ...............................................................OFF

**NOTE** The Cockpit Map lights may be used to provide cockpit illumination at night when operating on #2 Buses Only.

┌ **Procedure Continued** ┐

**ELECTRICAL FIRE OR SMOKE** (continued)

➢ ***If smoke or fire decreases or ceases***

10. Accomplish OPERATION WITH #2 BUSES ONLY (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

➢ ***If smoke or fire persists***

10. L GENERATOR ........................................................ NORM
11. BUS TIE ........................................................ Normal
12. BATTERY ........................................................ NORM
13. Left DISPLAY REVERSION .................................... Normal
14. Left PFD Sensors ........................................ AHRS 1, ADC 1

**NOTE** Repowering left side buses will result in the **L ENG VIBRATION HIGH** and **R ENG VIBRATION HIGH** messages posting briefly following touchdown.

15. Land as soon as possible

--- END OF PROCEDURE ---

## ENVIRONMENTAL SYSTEM SMOKE OR ODOR

*Smoke or odor has been determined to originate from the environmental system*

1. CABIN INFLOW ........................................................L OFF

***If smoke or fire decreases or ceases***

2. Altitude.......................................Descend to FL 250 or below
3. Land at nearest suitable airport

--- END OF PROCEDURE ---

***If smoke persists***

2. CABIN INFLOW ........................................L NORM, R OFF

- ***If smoke or fire decreases or ceases***

3. Altitude.......................................Descend to FL 250 or below
4. Land at nearest suitable airport

--- END OF PROCEDURE ---

- ***If smoke persists***

3. CABIN INFLOW .................................................... Both OFF
4. CABIN OXYGEN............................................ DROP MASK

┌ **Procedure Continued** ┐

**ENVIRONMENTAL SYSTEM SMOKE OR ODOR** (continued)

5. Land as soon as possible
6. Accomplish EMERGENCY DESCENT
   (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

## L(R) ENGINE FIRE

***"LEFT (RIGHT) ENGINE FIRE"***

*A fire has been detected in the indicated engine*

1. **Thrust Lever (affected engine)......................................IDLE**

***If ENGINE FIRE indications still present after 15 seconds***

2. **Thrust Lever (affected engine)..............................CUT OFF**
3. **ENGINE FIRE PUSH Switch (affected engine)............Lift cover and push**
4. **FIRE EXT PUSH Switch (affected engine)..................Push**

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

5. FUEL CROSSFEED ...........................................As required
6. WING FLOW.............................. FROM L(R) (operable side)

┌ **Procedure Continued** ┐

**L(R) ENGINE FIRE** (continued)

7. TCAS (TCAS II only) ............................................TA ONLY
8. ENGINE ANTI-ICE (affected engine)..............................OFF
9. Altitude.......................................Descend to FL 250 or below
10. Land at nearest suitable airport
11. Accomplish SINGLE-ENGINE APPROACH AND LANDING (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If ENGINE FIRE indications are not still present after 15 seconds***

2. Thrust Lever (affected engine).....................Maintain at IDLE
3. FUEL CROSSFEED ........................................... As Required
4. WING FLOW.............................. FROM L(R) (operable side)

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

5. TCAS (TCAS II only) ............................................TA ONLY
6. Land at nearest suitable airport
7. Accomplish SINGLE-ENGINE APPROACH AND LANDING (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

# OPERATIONAL

## DITCHING

*The aircraft is required to be force landed in water*

**NOTE** Ditching has not been demonstrated. However, the following procedures are recommended.

**DESCENT**

1. Airspeed........................................140 KIAS
2. Transponder........................................7700
3. ELT........................................ON
4. Brief and prepare passengers for ditching
5. CABIN SIGNS........................................As required
6. Seat belts and harness........................................Fastened
7. Cabin seats........................................Positioned for landing
8. TAWS Warnings........................................Disable

┌ **Procedure Continued** ┐

**DITCHING** (continued)

**APPROACH**

1. FLAPS ................................................ TO/APPR (if operable)
2. Landing Gear ..................................................... Do not extend
3. CABIN SIGNS ...................................................... As required

**NOTE** Ditch parallel to and near the crest of the swell unless there is a crosswind of 20 knots or more. In strong wind, heading should be more into the wind and slightly across the swell, planning to touch down on the upslope of the swell near the top.

Wave motion is indicative of wind direction, but the swell does not necessarily move with the wind. Water surface conditions are indicative of wind speed, as related below.

| Surface Condition | Wind Speed (kts) |
|---|---|
| Few white crests | 10 – 15 |
| Many white crests | 15 – 25 |
| Streaks of foam from crests | 25 – 35 |
| Spray blown from tops of waves | 35 – 45 |

┌ **Procedure Continued** ┐

## DITCHING (continued)

### LANDING

1. FLAPS ........................................................ LDG (if operable)
2. CABIN DUMP ............................................................DUMP
3. ENGINE BLEED (Both)..................................................OFF
4. Sink rate..................................................200 – 300 ft / minute
5. GENERATOR.......................................................... Both OFF

### AFTER LANDING

1. Touchdown.................................................. Slightly nose high
2. Thrust Levers...........................................................CUT OFF
3. Emergency Exit Door .........................Open, evacuate airplane
4. Main Entrance Door ...........................Open, evacuate airplane

***CAUTION*** *The lower edge of the Main Entrance Door should be above the waterline during calm seas. During rough seas only the Emergency Exit Door should be used.*

--- END OF PROCEDURE ---

## EMERGENCY DESCENT

EDM

*A maximum rate descent is required due to an emergency condition*

1. **Thrust Levers.......................................................... IDLE**
2. **SPEEDBRAKE (if installed) ........................................ EXT**
3. **Airspeed..............................................Maintain $V_{MO}$ / $M_{MO}$**

**CAUTION** *If structural damage is suspected, limit airspeed to a speed lower than $V_{MO}$ / $M_{MO}$ and limit maneuvering loads until damage assessment can be made.*

**CAUTION** *Emergency Descent Mode (EDM) will automatically command a descent at $V_{MO}$/$M_{MO}$. If a lower speed is desired, the autopilot must be disengaged.*

**NOTE** EDM cannot guarantee a maximum rate of descent. The pilot must ensure the thrust levers are commanded to IDLE.

**NOTE** If the airplane is above 25,000 ft MSL, and the autopilot is engaged, it will automatically enter EDM when the CABIN ALT HIGH warning message posts.

**Procedure Continued**

## EMERGENCY DESCENT (continued)

4. Transponder........................................................... 7700
5. CABIN OXYGEN........................DROP MASK (as required)
6. CABIN SIGNS ...........................................................ON
7. ATC...........................Notify and obtain local altimeter setting
8. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher
9. Land at nearest suitable airport

**NOTE** EDM will automatically set the altitude pre-selector to 15,000 ft.

--- END OF PROCEDURE ---

## EMERGENCY EVACUATION

*The aircraft is required to be evacuated in an emergency situation*

1. PARKING BRAKE........................................................... Set
2. Thrust Levers...........................................................CUT OFF
3. ENGINE FIRE PUSH Switches.....................................LIFT COVER and PUSH
4. FIRE EXT PUSH Switch .............................Push (if required)
5. BATTERY...................................................................OFF
6. Evacuate the aircraft using the cabin door and/or the emergency exit

--- END OF PROCEDURE ---

## INADVERTENT OVERSPEED

**Warble Tone**

*The aircraft has inadvertently exceeded $V_{MO}$ or $M_{MO}$*

1. Thrust Levers........................................................IDLE
2. SPEEDBRAKE (if installed)............................................ EXT
3. Perform wings level pull-up

**NOTE** AFCS Overspeed Protection (OSP) mode will engage when speed exceeds 276 KIAS or M 0.73 if the Flight Director is active and the vertical mode is not ALT. OSP will command a 1.5g pull until speed decreases to below 267 KIAS / M 0.715.

--- END OF PROCEDURE ---

## OPERATION WITH EMERGENCY POWER ONLY

*The aircraft is operating on battery power only*

**NOTE** When selected on, the Cockpit Flood light provides illumination during all electrical system configurations and may be used when executing this procedure at night.

1. Icing Conditions ............................................................Exit

***CAUTION*** *Windshield heat, wing anti-ice, and tail de-ice systems are not available when operating with emergency power only.*

2. L PFD .................. Verify displaying AHRS 1and STBY ADC
3. Radio ....................................................................... COM 1

**NOTE** COM 1, NAV 1 and 2, and GPS are the only communication and navigation sources available on emergency power.

4. Navigation ..............................NAV 1 or 2, or GPS based only
5. Transponder.................................................... Verify XPDR 1
6. SPEEDBRAKE (if installed)..........................................RET

┌ **Procedure Continued** ┐

## OPERATION WITH EMERGENCY POWER ONLY
(continued)

7. PRESSURIZATION CONTROL MODE..................... HOLD
8. RVSM airspace.................................................................Exit
9. Land as soon as possible

**NOTE** A minimum of 60 minutes of operation on battery power has been demonstrated.

### DESCENT

1. Altimeters (transition altitude) .......................................... Set

### APPROACH

1. Seats and Seat Belts.................................. Adjusted and secure
2. Passenger Briefing.................................................... Complete
3. Avionics......................................................................... Set
4. Landing Data Set and confirmed
   a. Radios and Navigation .......................................... Set

**NOTE** COM 1, NAV 1 and 2, and GPS are the only communication and navigation sources available on emergency power.

┌ **Procedure Continued** ┐

## OPERATION WITH EMERGENCY POWER ONLY (continued)

b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected

c. Landing Distance...........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

**NOTE** If icing conditions cannot be avoided, reference LANDING WITH ICE ACCUMULATION ON WINGS and SIDE WINDOW LANDING (Section 3A – Abnormal Procedures).

5. CAS Messages..............................................................Check
6. Approach Briefing....................................................Complete
7. LANDING Light ................................................................ON
8. FLAPS.......................................................................TO/APPR

┌ **Procedure Continued** ┐

## OPERATION WITH EMERGENCY POWER ONLY
(continued)

### BEFORE LANDING

1. Landing Gear Alternate extension
   a. LDG GEAR CTRL circuit breaker............PULL (B7)
   b. LANDING GEAR................................................ DN
   c. Airspeed..................................... 150 KIAS minimum
   d. ALTERNATE GEAR RELEASE handle..... Pull fully
   e. Yaw airplane, if necessary, to obtain gear locked down
   f. LANDING GEAR indicator.... Verify three green DN

**NOTE** The gear DOOR icon will remain posted but a normal landing is possible without gear door-ground contact.

   g. ALTERNATE GEAR RELEASE handle............Stow

***CAUTION*** *The ALTERNATE GEAR RELEASE handle could interfere with thrust lever operation if not stowed following use.*

**NOTE** Normal landing gear operations cannot be restored in flight after activation of the alternate gear release.

┌ **Procedure Continued** ┐

## OPERATION WITH EMERGENCY POWER ONLY
(continued)

2. FLAPS ........................................................................ LDG
3. Airspeed........................................................................ $V_{REF}$ + 5
4. CABIN DUMP ................................................................DUMP

**WARNING** **The airplane must be unpressurized prior to landing.**

### LANDING

1. Thrust Levers................................................................ IDLE
2. Brakes ...............................................Apply (after touchdown)
3. SPEEDBRAKE (if installed)...........................................EXT

**NOTE** The speedbrake may not be operational, or the deflection may be reduced depending on the system and normal accumulator pressure at the time of landing.

┌ **Procedure Continued** ┐

## OPERATION WITH EMERGENCY POWER ONLY
(continued)

### FOLLOWING LANDING ROLLOUT

1. Do not taxi
2. Wheel chocks ................................................................. Install

***CAUTION*** *Following landing rollout, the emergency and brake accumulators may drop below the level required for nosewheel steering and braking.*

**┌ Procedure Continued ┐**

| The following equipment is **OPERATIVE** for a limited time | |
|---|---|
| **Communication** | |
| L and R Intercom | COM 1 |
| **Navigation / AFCS** | |
| L PFD (using Standby Air Data) | MFD |
| NAV 1 | L CDU |
| Transponder 1 | NAV 2 |
| AHRS 1 | Standby Instrument |
| Standby AHRS and ADC | GPS |
| Low Speed Awareness (Degraded Mode) | Rudder Bias |
| **Engine** | |
| Engines* | FADEC Control* |
| Engine Instruments | Ignition |
| Fire Detection | Fire Extinguishers |
| Vibration Detection | |
| **Flight Control** | |
| Normal Flight Controls* | All Trim |
| Flaps | |
| **Landing Gear and Brakes** | |
| Landing Gear (alternate extension)* | Normal Brakes (accumulator)* |
| Hydraulic Pump (ground only) | Anti-Skid (if normal brakes available) |
| Parking Brake (accumulator) | Emergency Brake (accumulator)* |
| Nosewheel Steering (accumulator)* | |
| **Fuel** | |
| Fuel Pumps | Fuel Shutoff Valves |
| Fuel Quantity Indications | Fuel Low Level Sensors |
| Fuel Crossfeed | |
| **Environmental** | |
| Engine Bleed | Pressurization (HOLD Mode) |
| Dump Mode | Oxygen* |
| Bleed Leak Detection | |
| **Ice Protection** | |
| Ice Detection | Standby Probe Heat |
| Engine Anti-ice (failed on) | |
| **Lighting** | |
| Cockpit Flood Light | L Ice Inspection Light |
| L Landing Light | Footwell Lights |

**NOTE:** * These items do not require aircraft electrical power to operate and are not time limited.

--- END OF PROCEDURE ---

## OPERATION WITH #1 BUSES ONLY

*Operation of the aircraft with #1 buses only is required*

1. Thrust Levers.....................................Avoid rapid movements

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

2. Icing Conditions .............................................................Exit
3. Radio ........................................................................ COM 1

**NOTE** Copilot will lose all communication capability.

4. Navigation .....................................................NAV 1 or GPS

**NOTE** COM 1, NAV 1, and GPS are the only communication and navigation sources available during #1 bus only operation.

┌ **Procedure Continued** ┐

## OPERATION WITH #1 BUSES ONLY (continued)

5. Transponder.................................................... Verify XPDR 1
6. R WINDSHIELD HEAT.................................................OFF
7. R ENGINE BLEED........................................................OFF
8. WING FLOW ........................................................FROM L
9. PRESSURIZATION CONTROL MODE..................... HOLD
10. Altitude.......................................Descend to FL 250 or below
11. Land at nearest suitable airport

**DESCENT**

1. Altimeters (transition altitude) ........................................... Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. Avionics.......................................................................... Set
4. Landing Data Set and confirmed
    a. Radios and Navigation .......................................... Set
    b. V-speeds, FMS, and Flight Guidance................... Set, programmed, and modes selected
    c. Landing Distance..........................................Confirm

**Procedure Continued**

## OPERATION WITH #1 BUSES ONLY (continued)

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

**NOTE** If icing conditions cannot be avoided, reference LANDING WITH ICE ACCUMULATION ON WINGS and SIDE WINDOW LANDING (Section 3A – Abnormal Procedures).

5. CAS Messages....................................................Check
6. Approach Briefing............................................Complete
7. FLAPS..........................................................TO/APPR

┌ **Procedure Continued** ┐

## OPERATION WITH #1 BUSES ONLY (continued)

### BEFORE LANDING

1. LANDING GEAR ........................................................... DN

**NOTE** Hydraulic pressure indications will be unavailable during #1 bus operation, but the hydraulic pump will be operable.

2. Cabin Differential Pressure ................. Verify less than 0.3 psi
3. CABIN DUMP ........................................ DUMP (if required)

**WARNING** **The airplane must be unpressurized prior to landing.**

4. FLAPS ....................................................................... LDG
5. Airspeed............................................................... $V_{REF}$ + 5
6. Autopilot/Yaw Damper ........................................... Disengage

### LANDING

1. Thrust Levers.............................................................. IDLE
2. Brakes .............................................Apply (after touchdown)

┌ **Procedure Continued** ┐

| The following equipment will be **INOPERATIVE** during #1 bus only operations | |
|---|---|
| **Communication** | |
| COM 2 | R Audio |
| **Navigation / AFCS** | |
| R PFD | MFD |
| R CDU | TCAS II |
| AHRS 2 and ADC 2 | NAV 2 |
| ADF | CVFDR |
| Transponder 2 | DME |
| Radio Altimeter | Weather Radar |
| SATCOM / Connext™ Weather | Stall Pusher |
| **Engine** | |
| Right Oil Temperature | R Fire Detection |
| R Fire Extinguisher | Vibration Detection |
| **Flight Control** | |
| Standby Pitch Trim | Speedbrake |
| **Landing Gear and Brakes** | |
| Hydraulic (indication) | |
| **Fuel** | |
| R Fuel Low Level Sensor | Fuel Crossfeed |
| R Fuel Quantity | R Fuel Shutoff Valve |
| R Fuel Pump | |
| **Environmental** | |
| Air Conditioner | R Bleed Leak Detection |
| R Engine Bleed | Cabin Oxygen Automatic Deployment |
| Pressure Control (normal) | Oxygen Quantity (Ind) |
| | Cabin Fan |
| **Ice Protection** | |
| R Wing Anti-ice Valve | R Engine Anti-ice (failed on) |
| R Windshield Zone Heat | Right Probe Heat |
| Ice Detector 2 | |
| **Lighting** | |
| R Landing Light | Strobe Lights |
| Logo Lights | Taxi Lights |
| RECOG Lights | NAV Lights |
| Cockpit Map Lights | Cabin Overhead Lights |
| Copilot Footwell Light | Cabin Signs |
| Ice Inspection Lights | |

--- END OF PROCEDURE ---

## OPERATION WITH #2 BUSES ONLY

*Operation of the aircraft with #2 buses only is required*

1. PITCH TRIM MODE.................................................... STBY
2. Thrust Levers......................................Avoid rapid movements

**CAUTION** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

3. Icing Conditions ...........................................................Exit
4. Radio ........................................................................ COM 2

**CAUTION** *Pilot will not hear intercom or alerts through headset, but alerts will be automatically routed to cross-side speaker. Speaker volume may need to be adjusted to ensure alerts can be heard while wearing headset.*

┌ **Procedure Continued** ┐

## OPERATION WITH #2 BUSES ONLY (continued)

**NOTE** The pilot's boom mic, or oxygen mask mic is automatically routed to COM 2 for communication with ATC.

**NOTE** Marker beacon functionality (aural and visual) will be inoperative on the pilot's side.

5. Navigation ........................................................ NAV 2 or GPS

**NOTE** COM 2, NAV 2, and GPS are the only communication and navigation sources available for #2 bus only operation.

6. Transponder................. XPDR 2 (if applicable) or notify ATC
7. L WINDSHIELD HEAT.................................................. OFF
8. L ENGINE BLEED........................................................ OFF
9. WING FLOW ....................................................... FROM R
10. Altitude....................................... Descend to FL 250 or below
11. NOSE WHEEL STEERING ........................................... OFF

┌ **Procedure Continued** ┐

## OPERATION WITH #2 BUSES ONLY (continued)

12. Select a long, wide, and dry runway with minimal crosswind

WARNING **Anti-skid is not available. Any braking above light in wet runway conditions could result in blown tires and loss of directional control.**

***CAUTION*** *Nosewheel steering is inoperative. Crosswinds should be minimized to ensure adequate directional control during the low-speed portion of the rollout using differential braking.*

**NOTE** Landing distance will double on a wet runway using light braking.

13. Land at nearest suitable airport

**NOTE** Stall Pusher is inoperative. Low Speed Awareness remains operative in a degraded mode based on remaining ADC AOA data.

┌ **Procedure Continued** ┐

## OPERATION WITH #2 BUSES ONLY (continued)

### DESCENT

1. Landing Field Elevation .......................................... Verify set
2. Altimeters (transition altitude) ........................................... Set

### APPROACH

1. Seats and Seat Belts..................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. Avionics........................................................................... Set
4. Landing Data Set and confirmed
   a. Radios and Navigation ........................................... Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance...........................................Confirm

**┌ Procedure Continued ┐**

## OPERATION WITH #2 BUSES ONLY (continued)

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| UP | $V_{REF}$ + 20 | Add 105% |
| TO/APPR | $V_{REF}$ + 10 | Add 75% |
| LDG | $V_{REF}$ + 5 | Add 60% |

**NOTE** Flaps are inoperative during #2 bus only operation. The flap setting at the time #2 bus only operation was initiated will be the final flap setting.

**NOTE** Due to anti-skid and the stall pusher being inoperative, the minimum approach speed and landing distance factors are defined in the table.

**NOTE** Landing distance will double on a wet runway using light braking.

**NOTE** If icing conditions cannot be avoided, reference LANDING WITH ICE ACCUMULATION ON WINGS and SIDE WINDOW LANDING (Section 3A – Abnormal Procedures).

5. CAS Messages.............................................................Check
6. Approach Briefing..................................................Complete

┌ **Procedure Continued** ┐

## OPERATION WITH #2 BUSES ONLY (continued)

### BEFORE LANDING

1. Landing Gear Alternate Extension
   a. LDG GEAR CTRL circuit breaker............PULL (B7)
   b. LANDING GEAR................................................ DN
   c. Airspeed..................................... 150 KIAS minimum
   d. ALTERNATE GEAR RELEASE handle..... Pull fully
   e. Yaw airplane, if necessary, to obtain gear locked down
   f. LANDING GEAR indicator.... Verify three green DN

   **NOTE** The gear DOOR icon will remain posted but a normal landing is possible without gear door - ground contact.

   g. ALTERNATE GEAR RELEASE handle............Stow

***CAUTION*** *The ALTERNATE GEAR RELEASE handle could interfere with thrust lever operation if not stowed following use.*

**NOTE** Normal landing gear operations cannot be restored in flight after activation of the alternate gear release.

┌ **Procedure Continued** ┐

## OPERATION WITH #2 BUSES ONLY (continued)

2. Airspeed.................................. (Flaps UP) - $V_{REF}$ + 20
   (Flaps TO/APPR) - $V_{REF}$ + 10
   (Flaps LDG) - $V_{REF}$ + 5
3. Yaw Damper........................................................ Disengage

### LANDING

1. Thrust Levers............................................................ IDLE
2. Brakes......................................................... Apply Gradually
3. Maintain directional control with rudder and differential braking

***CAUTION*** *Brakes must be applied gradually. Light to moderate braking can be applied without skidding tires on a dry surface, however, the pilot should consider runway surface conditions when applying brakes.*

### FOLLOWING LANDING ROLLOUT

1. R ENGINE BLEED.........................................................OFF
2. Do not taxi
3. Wheel chocks ............................................................. Install

***CAUTION*** *Following landing rollout, the emergency and brake accumulators may drop below the level required for braking.*

┌ **Procedure Continued** ┐

| The following equipment will be **INOPERATIVE** during #2 bus only operations | |
|---|---|
| **Communication** | |
| COM 1 | L Audio |
| **Navigation / AFCS** | |
| Autopilot | L PFD |
| AHRS 1 and ADC 1 | XM Weather |
| Standby Instrument | NAV 1 |
| Transponder 1 | Control Yoke System Control |
| Standby AHRS and ADC | L CDU |
| Weather Radar | TCAS |
| Stall Pusher | SATCOM / Connext$^{TM}$ Weather |
| Low Speed Awareness (degraded mode) | |
| **Engine** | |
| L Engine Instruments | L Fire Detection |
| L Fire Extinguisher | |
| **Flight Control** | |
| Pitch (primary), Roll and Yaw Trim | Speedbrake |
| Flaps | |
| **Landing Gear and Brakes** | |
| Landing Gear (normal extension) | Anti-Skid |
| Hydraulic Pump | Nosewheel Steering |
| **Fuel** | |
| L Fuel Pump | L Fuel Shutoff Valve |
| Left Fuel Quantity | Left Fuel Low Level Sensor |
| Center Fuel Quantity | |
| **Environmental** | |
| Left Engine Bleed | L Bleed Leak Detection |
| Cockpit Fan | Ground Cooling Fan |
| Air Conditioner | |
| **Ice Protection** | |
| Ice Detector 1 | L Engine Anti-ice (failed on) |
| Standby Probe Heat | L Wing Anti-ice Valve |
| L Windshield Zone Heat | L Probe Heat |
| **Lighting** | |
| Beacon | L Landing Light |
| Cabin Overhead Lights | Cabin Signs |
| Cockpit Flood Light | NAV Lights |
| Footwell Lights | Right Taxi Light |
| Ice Inspection Lights | |

--- END OF PROCEDURE ---

## REJECTED TAKEOFF

*A condition requiring the takeoff to be rejected has been encountered*

1. **Thrust Levers..........................................................IDLE**
2. **Brakes......................................... Apply maximum braking**
3. **SPEEDBRAKE (if installed) ....................................... EXT**

**NOTE** Consult the Aircraft Maintenance Manual (AMM) for required maintenance actions if a rejected takeoff is conducted above 100 knots ground speed.

--- END OF PROCEDURE ---

## STALL RECOVERY

STALL

*The aircraft has stalled or is approaching stall*

1. Pitch Attitude..........................Lower to reduce angle of attack
2. Thrust Levers................................................................ TO
3. Level the wings
4. Airspeed................................ Accelerate above stall condition

--- END OF PROCEDURE ---

## WINDSHEAR OR TERRAIN AVOIDANCE

PULL UP

WINDSHEAR

*A condition has been encountered requiring a vertical escape maneuver*

1. Pitch Attitude........................................................ 15° initially
2. Thrust Levers....................................................................TO
3. Do not change gear or flap configuration
4. Pitch Attitude............Adjust to maintain close to shaker speed

--- END OF PROCEDURE ---

## TAKEOFF CONFIG

***"TAKEOFF CONFIGURATION"***

NO TAKEOFF

*One or more configuration items are not properly set for takeoff*

1. Accomplish REJECTED TAKEOFF
   (Section 3 – Emergency Procedures)

--- END OF PROCEDURE ---

## PFD / EIS / ASI FLAGS

*The following malfunctions are indicated by flags*

| Display Flag / Indication | Description |
|---|---|
| **AFCS** | |
| AP | The autopilot has disconnected abnormally. This alert is accompanied by continuous disconnect aural tones. These alerts will repeat continuously until acknowledged. Refer to the Cockpit Reference Guide for details. |
| **SurfaceWatch** | |
| RWY TOO SHORT | The aircraft is aligned with a runway during takeoff or landing that is too short, as determined by the SurfaceWatch. This is accompanied by the “Runway Too Short” aural alert. Refer to the Cockpit Reference Guide for details. |
| TWY LANDING | The aircraft is aligned with a taxiway during the landing phase, as detected by the SurfaceWatch. This is accompanied by the “Taxiway” aural alert. Refer to the Cockpit Reference Guide for details. |
| TWY TAKEOFF | The aircraft is aligned with a taxiway and thrust levers are set to TO, as detected by the SurfaceWatch. This is accompanied by the “Taxiway” aural alert. Refer to the Cockpit Reference Guide for details. |

| Display Flag / Indication | Description |
|---|---|
| **Traffic Collision and Avoidance System (TCAS)** | |
| TRAFFIC | Resolution Advisory (RA) is active. A potentially hazardous intruding aircraft has been detected and is closing to within 15-35 seconds of a potential collision area. An appropriate aural alert is also issued, providing the flight crew with maneuver instructions to avoid the hazardous traffic. This alert is only applicable to TCAS II installations. Refer to the Cockpit Reference Guide for details. |

## SECTION 3A

# ABNORMAL PROCEDURES

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## SECTION 3A

# ABNORMAL PROCEDURES

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FLIGHT CONTROLS



FUEL SYSTEMS

**HYDRAULIC SYSTEMS**



**ICE PROTECTION SYSTEMS**

LANDING GEAR AND BRAKES



OPERATIONAL

# ABNORMAL PROCEDURES

## GENERAL

The procedures contained in this section have been developed to provide a means to maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure condition.

Abnormal procedures are grouped by functional system. Within each functional system area, the procedures are sorted by non-CAS procedures, CAS based, and other visual indications such as PFD flags. Each sub-group is sorted by alphabetical order.

Certain failures are capable of compromising multiple airplane systems. The pilot must respond directly to each annunciated or otherwise identified, system failure and consult the AFM for each specific Abnormal or Emergency procedure. For cases where multiple procedures specify different airplane configurations for continued safe flight and landing, the most restrictive must be used. If multiple procedures specify additional landing distance factors, each factor is additive and applied to the normal landing distance.

Procedures are for use in flight unless other conditions are specifically called out. If not specifically addressed while on the ground, conditions addressed in this section must be corrected prior to flight, unless dispatch is allowed by an approved MEL or otherwise authorized by the appropriate aviation authority.

## TERMINOLOGY

Sound judgment, a thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential for handling any abnormal situation. Some failures may compromise airworthiness or functionality, and therefore, the term “land at nearest suitable airport” may be used which is defined as:

**Land at nearest suitable airport** – the mission should be terminated, and the aircraft landed at a suitable airfield. The airfield and duration of the flight is left to the aircrew’s discretion based on their specific circumstances. Considerations should include (but are not limited to):

- Severity of the emergency
- Aircraft performance
- Field facilities
- Weather
- Ambient conditions such as lighting
- Degraded aircraft functionality

# AVIONICS / AFCS

## PRIMARY FLIGHT or MULTI-FUNCTION DISPLAY FAILURE

*A Primary Flight Display or Multi-Function Display has failed.*

**LEFT PFD FAILED**

1. DISPLAY REVERSION (pilot side) ................................ REV

--- END OF PROCEDURE ---

**RIGHT PFD FAILED**

1. Transfer controls to left seat pilot

--- END OF PROCEDURE ---

**MFD FAILED**

1. DISPLAY REVERSION (pilot flying) ............................ REV

--- END OF PROCEDURE ---

## AFCS MISTRIM

*Autopilot is holding constant force.*

1. Flight Controls........................................................ Hold firmly

**NOTE** Expect high flight control forces when autopilot is disengaged. Axis and direction of mistrim is indicated by flag in upper left hand corner of the PFD.

2. Trim aircraft as necessary
3. Yaw Damper.............................................Engage as required
4. Autopilot..................................................Engage as required

--- END OF PROCEDURE ---

## AHRS 1(2) FAIL

*The associated AHRS unit has failed.*

***If system does not automatically revert to operable AHRS***

1. PFD (affected side)............................... Select operable AHRS

--- END OF PROCEDURE ---

## AIR DATA 1(2) FAIL

*The associated air data computer is not providing proper data.*

1. PFD (affected side).................. Ensure operable ADC selected
2. RVSM airspace............................................................Exit
3. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

**PRIOR TO LANDING**

4. Final approach speed.............................................. $V_{REF}$ + 5

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |
| TO/APPR (ice) | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

--- END OF PROCEDURE ---

## L(R) AUDIO FAIL

*The intercom and associated speaker, handmic, and oxygen mask mic have failed.*

1. Headset (affected side) ..................................................... Don
2. Speaker Volume (opposite side).....................................Adjust

***CAUTION*** *Pilot with failed audio will not hear intercom or alerts through headset, but alerts will be automatically routed to cross-side speaker. Speaker volume may need to be adjusted to ensure alerts can be heard while wearing headset.*

**NOTE** The handheld microphone, speaker and oxygen mask mic on the failed side are inoperative.

**NOTE** The audio system on the failed side will default to use of the onside radio only at a fixed volume.

**NOTE** Marker beacon functionality (aural and visual) will be inoperative on the failed side.

--- END OF PROCEDURE ---

## AVIONICS COMPUTER 1 FAIL

*Avionics computer 1 has failed.*

1. Radio ........................................................................ COM 2
2. Navigation ............................................ Select NAV 2 or GPS
3. Transponder..................Ensure operating transponder selected
4. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on available valid ADC AOA data.

**NOTE** Failure of Avionics Computer 1 will cause associated failures which will result in the following CAS messages: **FLAP FAULT**, **NOSEWHEEL STEER FAULT**, **TAIL DEICE FAULT**. The procedures for those messages should be followed in addition to this procedure.

**Procedure Continued**

**AVIONICS COMPUTER 1 FAIL** (continued)

**PRIOR TO LANDING**

5. Final approach speed .................................................. $V_{REF} + 5$

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF} + 5$ | Add 10% |
| TO/APPR (ice) | $V_{REF} + 5$ | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

| **The following equipment will be INOPERATIVE with Avionics Computer 1 failure** | |
|---|---|
| **Communication** | |
| COM 1 tuning (defaults to 121.5) | NAV 1 |
| GPS 1 | Transponder 1 (only for dual installations) |
| **Navigation / AFCS** | |
| AHRS 1 and 2 (degraded) | CSC |
| TAWS (degraded) | Radio Altimeter |
| Stall Pusher | TCAS |
| **Engine** | |
| L Fire Suppression CAS | |
| **Flight Control** | |
| Flaps (Degraded) | |

--- END OF PROCEDURE ---

## AVIONICS COMPUTER 2 FAIL

*Avionics computer 2 has failed.*

1. Radio ........................................................................ COM 1
2. Navigation ....................................................... NAV 1 or GPS
3. Transponder.................................................. Verify XPDR 1
4. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on available valid ADC AOA data.

**NOTE** Failure of Avionics Computer 2 will cause associated failures which will result in the following CAS messages: **FLAP FAULT**, **NOSEWHEEL STEER FAULT**. The procedures for those messages should be followed in addition to this procedure.

┌ **Procedure Continued** ┐

**AVIONICS COMPUTER 2 FAIL** (continued)

## PRIOR TO LANDING

5. Final approach speed ........................................... $V_{REF} + 5$

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF} + 5$ | Add 10% |
| TO/APPR (ice) | $V_{REF} + 5$ | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

| **The following equipment will be INOPERATIVE with an Avionics Computer 2 failure** | |
|---|---|
| **Communication** | |
| COM 2 tuning (defaults to 121.5) | NAV 2 |
| GPS 2 | Transponder 2 |
| **Navigation / AFCS** | |
| AHRS 1 and 2 (degraded) | Stall Pusher |
| ILS/BC on Standby Instrument | CSC |
| **Engine** | |
| R Fire Suppression CAS | |
| **Flight Control** | |
| Flaps (Degraded) | Speedbrake Auto-retract |

--- END OF PROCEDURE ---

## CPDLC FAIL

*The CPDLC has failed.*

1. Select other means of communication

--- END OF PROCEDURE ---

## DATA ACQUISITION 1 FAIL

*Data Acquisition Unit 1 has failed.*

1. L FUEL PUMP....................................................................ON
2. Icing Conditions ...............................................................Exit
3. ENGINE ANTI-ICE...............................Both OFF, if practical
4. WING ANTI-ICE.............................................................OFF
5. ITT..................................................................................Monitor

***CAUTION*** *Engines will not sense operation of wing anti-ice or left engine anti-ice. This could result in an engine ITT exceedance if TO or MCT power is selected and the wing or engine anti-ice is on.*

6. Land at nearest suitable airport

┌**Procedure Continued** ┐

**DATA ACQUISITION 1 FAIL** (continued)

**BEFORE SHUTDOWN**

7. Wheel Chocks............................................................... Install

**NOTE** Failure of Data Acquisition Unit 1 will cause associated failures which will result in the following CAS messages: **L ENG CONTROL FAULT**,
**R ENG CONTROL FAULT**,
**WING ANTI-ICE FAULT**,
**L ENG ANTI-ICE FAULT**,
**L ENG BLEED FAULT**,
**PITCH TRIM FAULT**,
**L ENG FAULT**,
**NOSEWHEEL STEER FAULT**.

The procedures for those messages should be followed in addition to this procedure.

┌**Procedure Continued** ┐

**DATA ACQUISITION 1 FAIL** (continued)

| | |
|---|---|
| **The following equipment will be INOPERATIVE with Data Acquisition Unit 1 failure** | |
| **Engine** | |
| L Fuel Filter Pressure Sensing | L Oil Filter Pressure Sensing |
| L Chip Detector Sensing | L Oil Level |
| L Vibration Detection | L Oil Temperature |
| L and R Wing Anti-ice Sensing | |
| **Hydraulic** | |
| Volume and System Pressure (Ind.) | Emergency/Parking Brake Pressure (Ind.) |
| Anti-Skid Fail monitor | |
| **Fuel** | |
| L Fuel Pump Automatic Activation | L Fuel Pump Fail Sensing |
| L and R SOV Position (Ind.) | Crossfeed Valve (Ind.) |
| L Fuel Temperature | L Fuel Pump (Ind.) |
| **Environmental** | |
| L Manifold Temp and Press (Ind.) | L and R CABIN INFLOW (Ind.) |
| L ENG Bleed (Ind.) | L Eng Bleed Leak Detection |
| **Ice Protection** | |
| L Eng Anti-ice Temp and Press (Ind.) | L Wing Anti-ice Valve (Ind.) |
| L WINDSHIELD Zone (Ind.) | Wing Anti-ice High Flow |
| Wing Bleed Leak Detection | |

--- END OF PROCEDURE ---

## DATA ACQUISITION 2 FAIL

*Data Acquisition Unit 2 has failed.*

1. R FUEL PUMP ................................................................ ON
2. Icing Conditions ...............................................................Exit
3. ENGINE ANTI-ICE.............................Both OFF, if practical
4. WING ANTI-ICE...............................................................OFF
5. ITT........................................................................ Monitor

***CAUTION*** *Engines will not sense operation of wing anti-ice or right engine anti-ice. This could result in an engine ITT exceedance if TO or MCT power is selected and the wing or engine anti-ice is on.*

6. Land at nearest suitable airport

**BEFORE SHUTDOWN**

7. Wheel Chocks................................................................ Install

┌ **Procedure Continued** ┐

**DATA ACQUISITION 2 FAIL** (continued)

**NOTE** Failure of Data Acquisition Unit 2 will cause associated failures which will result in the following CAS messages: **R ENG CONTROL FAULT**, **WING ANTI-ICE FAULT**, **R ENG ANTI-ICE FAULT**, **R ENG BLEED FAULT**, **L CABIN BLEED FAULT**, **PITCH TRIM FAULT**, **R ENG FAULT**, **NOSEWHEEL STEER FAULT**. The procedures for those messages should be followed in addition to this procedure.

**Procedure Continued**

## DATA ACQUISITION 2 FAIL (continued)

| The following equipment will be INOPERATIVE with Data Acquisition Unit 2 failure | |
|---|---|
| **Engine** | |
| R Fuel Filter Pressure Sensing | R Oil Filter Pressure Sensing |
| R Chip Detector Sensing | R Oil Level |
| R Vibration Detection | R Oil Temperature |
| L and R Wing Anti-ice Sensing | |
| **Electrical** | |
| R Generator Voltage or Current (Ind.) | |
| **Hydraulic** | |
| Anti-Skid Fail Monitor | Parking/Emer Brake Position Sensing |
| Hydraulic Pump (Ind.) | Main Accumulator Pressure (Ind.) |
| **Fuel** | |
| R Fuel Pump Automatic Activation | R Fuel Pump Fail Sensing |
| L and R SOV Closed Position (Ind.) | Crossfeed Valve Closed (Ind.) |
| **Environmental** | |
| R Manifold Temp and Press (Ind.) | L and R ENG Bleed (Ind.) |
| R Eng Bleed Leak Detection | L and R HPRSOV (Ind.) |
| **Ice Protection** | |
| R Eng Anti-ice Temp and Press (Ind.) | Ice Detector 2 |
| R WINDSHIELD Zone (Ind.) | R Zone Temp (Ind.) |
| Wing Crossflow (Ind.) | R Eng Anti-ice (Ind.) |
| Wing Anti-ice High Flow | |

--- END OF PROCEDURE ---

## DATA ACQUISITION 3 FAIL

*Data Acquisition Unit 3 has failed.*

1. Icing Conditions ........................................................... Exit
2. WING ANTI-ICE ........................................................... OFF
3. ITT ........................................................... Monitor

***CAUTION*** *Engines will not sense operation of wing anti-ice. This could result in an engine ITT exceedance if TO or MCT power is selected and the wing or engine anti-ice is on.*

4. Land at nearest suitable airport

**NOTE** Failure of Data Acquisition Unit 3 will cause associated failures which will result in the following CAS messages: **L CABIN BLEED FAIL**, **R ENG CONTROL FAULT**, **WING ANTI-ICE FAULT**, **R CABIN BLEED FAULT**, **R ENG FAULT**, **NOSEWHEEL STEER FAULT**. The procedures for those messages should be followed in addition to this procedure.

┌ **Procedure Continued** ┐

**DATA ACQUISITION 3 FAIL** (continued)

| **The following equipment will be <u>INOPERATIVE</u> with Data Acquisition Unit 3 failure** | |
|---|---|
| **Engine** | |
| L and R Fire Extinguisher Status | |
| **Hydraulic** | |
| Normal Brake Pressure (Ind.) | Brake Accumulator Pressure (Ind.) |
| **Fuel** | |
| L and R Fuel Pressure (Ind.)<br>Fuel ISO Valve (Ind.) | R Fuel Temp Sensing<br>L and R Fuel Pump Control (Latched ON) |
| **Environmental** | |
| R Cabin Bleed Temp (Ind)<br>L and R Eng Bleed Leak Detection | Air Conditioner Status (Ind.)<br>Cockpit Duct Temp |
| **Doors** | |
| External Power Door (Ind.) | Electrical Service Doors (Ind.) |
| **Ice Protection** | |
| L and R Wing Anti-ice Valve (Ind.)<br>Wing Bleed Leak Detection | L or R Wing Anti-ice Sensing and Indication |

--- END OF PROCEDURE ---

## DATA CONCENTRATOR 1 FAIL

*Data Concentrator 1 has failed.*

1. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

***CAUTION*** *Left engine fire warning and suppression will be unavailable except the light in the ENGINE FIRE PUSH Switch.*

**NOTE** Failure of Data Concentrator 1 will cause associated failures which will result in the following CAS messages: **FUEL QTY FAULT**, **L ENG CONTROL FAULT**, **STALL PUSHER FAIL**, **L GENERATOR FAULT**, **ENG SYNC FAIL**, **R ENG FAULT**, **L ENG FAULT**, **AIR DATA 1 FAULT**, **AFCS FAULT**, **NOSEWHEEL STEER FAULT**. The procedures for those messages should be followed in addition to this procedure.

**NOTE** If use of the oxygen mask is required, the OXYGEN MASK AUDIO switch must be selected to EMER to activate the oxygen mask microphone.

┌ **Procedure Continued** ┐

## DATA CONCENTRATOR 1 FAIL (continued)

| **The following equipment will be <u>INOPERATIVE</u> with Data Concentrator Unit 1 failure** | |
|---|---|
| **Communication** | |
| Pilot Scroll Wheel | FDR Data to CVFDR |
| Pilot O2 Mask Mic Door Switch | |
| **Navigation / AFCS** | |
| Stall Pusher | ADC 1 Temperature Indication |
| ADF | XM Weather and Music |
| AHRS 1 (degraded) | INMARSAT |
| Weather Radar | CSC |
| **Engine** | |
| L Engine Fire Warning Aural | L Eng Fire Warning CAS and EI flag |
| L and R FADEC Data Redundancy | L Engine Fire Pushbutton |
| L Fire Extinguisher Control | Engine Sync |
| **Electrical** | |
| No indication of #1 side information | |
| **Fuel** | |
| L and CTR Fuel Quantity | Fuel Iso Valve Position (Ind.) |
| L and R SOV Position (Ind.) | |
| **Environmental** | |
| L ENG Bleed Valve (Ind.) | |
| **Lighting** | |
| Lighting Control 1 | Ice Inspection Light(s) |
| NAV Lights | L Landing Light |
| Beacon | R Taxi Light |

--- END OF PROCEDURE ---

## DATA CONCENTRATOR 2 FAIL

*Data Concentrator 2 has failed.*

1. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

***CAUTION*** *Right engine fire warning and suppression will be unavailable  except the light in the ENGINE FIRE PUSH Switch.*

**NOTE** Failure of Data Concentrator 2 will cause associated failures which will result in the following CAS messages: **FUEL QTY FAULT**, **R ENG CONTROL FAULT**, **STALL PUSHER FAIL**, **R GENERATOR FAULT**, **ENG SYNC FAIL**, **R ENG FAULT**, **AIR DATA 2 FAULT**, **AFCS FAULT**, **NOSEWHEEL STEER FAULT**. The procedures for those messages should be followed in addition to this procedure.

**NOTE** If use of the oxygen mask is required, the OXYGEN MASK AUDIO switch must be selected to EMER to activate the oxygen mask microphone.

┌ **Procedure Continued** ┐

## DATA CONCENTRATOR 2 FAIL (continued)

| The following equipment will be **INOPERATIVE** with Data Concentrator Unit 2 failure | |
|---|---|
| **Communication** | |
| Copilot Scroll Wheel | SATCOM / Connext™ Weather |
| Copilot O2 Mask Mic Door Switch | |
| **Navigation / AFCS** | |
| Stall Pusher | AHRS 2 (degraded) |
| Weather Radar | DME |
| ADC 2 Temperature Indication | CSC |
| **Engine** | |
| R Engine Fire Warning Aural | R Engine Fire CAS and EI flag |
| L and R FADEC Data Redundancy | R Engine Fire Pushbutton |
| R Engine Fire Extinguisher Control | Engine Sync |
| **Electrical** | |
| No indication of #2 side information | |
| **Fuel** | |
| R Fuel Quantity | Fuel Iso Valve Position (Ind.) |
| L and R SOV Position (Ind.) | Crossfeed Valve Position (Ind.) |
| **Environmental** | |
| Cabin Fan Speed (Ind.) | |
| **Lighting** | |
| Lighting Control 2 | Strobe Lights |
| L Taxi Light | RECOG Lights |
| R Landing Light | Logo Lights |

--- END OF PROCEDURE ---

## FLT DIR MODE CHANGE

*The flight director function has automatically reverted to a non-armed mode.*

1. Mode Control Panel......................... Re-engage desired modes

**NOTE** During approach, loss or unavailability of the navigation source signal could cause a flight director mode change. In this case, the desired mode may be unavailable until the navigation signal is available.

--- END OF PROCEDURE ---

## RUDDER BIAS FAIL

*The rudder bias system has failed.*

1. Maintain directional control with rudder inputs

**NOTE** Rudder forces with one engine inoperative will increase with Rudder Bias inoperative. Use of additional bank angle into the operable engine may be used to reduce residual forces.

--- END OF PROCEDURE ---

## STALL PUSHER FAIL

*The stall pusher has failed.*

1. Do not perform intentional stalls.

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on available valid ADC AOA data.

**PRIOR TO LANDING**

2. Final approach speed .................................................. $V_{REF} + 5$

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF} + 5$ | Add 10% |
| TO/APPR (ice) | $V_{REF} + 5$ | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

--- END OF PROCEDURE ---

## STALL WARN MISCOMP

*AOA 1 and AOA 2 do not agree within allowable limits.*

1. Compare Left and Right PFD air data information
2. PFD (affected side)................................ Select operable ADC
3. RVSM airspace..............................................................Exit

--END OF PROCEDURE ---

## TRANSPONDER MODE

*The transponder is not in ALT mode while airborne.*

1. Select appropriate transponder mode

***If TRANSPONDER MODE message remains posted***

2. Transponder...................Select other transponder (if installed)

***If TRANSPONDER MODE message remains posted***

3. RVSM airspace..............................................................Exit

--- END OF PROCEDURE ---

## YAW DAMPER FAIL

*The Yaw Damper system has failed.*

***If the autopilot is available***

1. Autopilot............................................................. Engage

**NOTE** Dutch Roll damping improves at all altitudes with the autopilot engaged

***If the autopilot is not available***

1. Altitude......................................................... FL 240 or lower

**NOTE** Dutch Roll damping improves at lower altitudes

2. Land at nearest suitable airport

--- END OF PROCEDURE ---

## YAW DAMPER OFF

*The Yaw Damper is operational but not selected during enroute flight operations.*

1. Yaw Damper................................................................ Engage

--- END OF PROCEDURE ---

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## PFD / EIS / ASI FLAGS

*The following malfunctions are indicated by flags*

| Display Flag / Indication | Description |
|---|---|
| **Air Data** | |
| IAS | An Indicated Airspeed miscompare of greater than 6 knots has been detected between the two primary air data probes. |
| ALT | An Altitude miscompare of greater than 200 ft. has been detected between the two primary air data probes.<br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |
| LSA FAIL | Low Speed Awareness is failed. |
| BOTH ON ADC 1 | The pilot and copilot PFDs are displaying air data from the #1 air data probe.<br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |
| BOTH ON ADC 2 | The pilot and copilot PFDs are displaying air data from the #2 air data probe.<br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |

| Display Flag / Indication | Description |
|---|---|
| **Air Data** (continued) | |
| BOTH ON ADC STBY | The pilot and copilot PFDs are displaying air data from the standby air data probe.<br><br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |
| USING ADC 1 | The copilot PFD is displaying air data from the #1 air data probe. |
| USING ADC 2 | The pilot PFD is displaying air data from the #2 air data probe. |
| USING ADC STBY | The pilot or copilot PFD is displaying air data from the standby air data probe.<br><br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |
| IAS | Indicates the avionics system is not able to perform the airspeed comparator function. Airspeed data is missing or invalid from one or both primary air data probes. |
| ALT | Indicates the avionics system is not able to perform the altitude comparator function. Altitude data is missing or invalid from one or both primary air data probes.<br><br>The aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited. |

| Display Flag / Indication | Description |
|---|---|
| **Attitude Heading Reference System (AHRS)** | |
| BOTH ON AHRS 1 | The pilot and copilot PFDs are displaying attitude and heading data from the #1 AHRS. |
| BOTH ON AHRS 2 | The pilot and copilot PFDs are displaying attitude and heading data from the #2 AHRS. |
| BOTH ON AHRS STBY | The pilot and copilot PFDs are displaying attitude and heading data from the standby AHRS. |
| USING AHRS 1 | The copilot PFD is displaying attitude and heading data from the #1 AHRS. |
| USING AHRS 2 | The pilot PFD is displaying attitude and heading data from the #2 AHRS. |
| USING AHRS STBY | The pilot or copilot PFD is displaying attitude and heading data from the standby AHRS. |
| PIT | A Pitch miscompare of greater than 5º has been detected between the two primary AHRS. |
| ROL | A Roll miscompare of greater than 6º has been detected between the two primary AHRS. |

| Display Flag / Indication | Description |
|---|---|
| **Attitude Heading Reference System (AHRS)** (continued) | |
| HDG | A Heading miscompare of greater than 6° has been detected between the two primary AHRS.<br>Note: This flag may be observed on the ground in the vicinity of equipment or buildings. |
| PIT | Indicates the avionics system is not able to perform the pitch comparator function. Pitch data is missing or invalid from one or both primary AHRS. |
| ROL | Indicates the avionics system is not able to perform the roll comparator function. Roll data is missing or invalid from one or both primary AHRS. |
| HDG | Indicates the avionics system is not able to perform the heading comparator function. Heading data is missing or invalid from one or both primary AHRS. |
| **Global Positioning System (GPS)** | |
| BOTH ON GPS 1 | GPS 2 is failed. The system is using GPS 1 for GPS position, vector, and time information. |
| BOTH ON GPS 2 | GPS 1 is failed. The system is using GPS 2 for GPS position, vector, and time information. |

| Display Flag / Indication | Description |
|---|---|
| **Global Positioning System (GPS)** (continued) | |
| DR | Dead Reckoning mode is active. The system is using non-navigation source information (heading, airspeed, etc.) to estimate aircraft position from last known navigation source position. |
| GPS LOI | GPS Loss of Integrity (LOI). This display flag indicates loss of GPS integrity monitoring functions or the integrity is insufficient for the current phase of flight. This flag is also displayed when both GPS units are failed. During this condition FMS course deviation data is removed from the PFD. |
| UNABLE RNP | The system is unable to achieve the required accuracy. |
| **Radio Altimeter** | |
| RA FAIL | The Radio Altimeter has failed. |
| **SurfaceWatch** | |
| CHECK RUNWAY | The aircraft is aligned with a runway that is not entered in the avionics, as detected by the SurfaceWatch. This is accompanied by the “Check Runway” aural alert. Refer to the Cockpit Reference Guide for details. |

| Display Flag / Indication | Description |
|---|---|
| **Terrain Awareness and Warning System** | |
| TERRAIN | Terrain Caution, accompanied by the appropriate aural and CDU pop-up alert, as determined by the TAWS. Refer to the Cockpit Reference Guide for details. |
| TAWS FAIL | The TAWS function has failed. All or portions of the TAWS function are not available. Refer to the Cockpit Reference Guide for details. This alert is accompanied by a “TAWS System Failure” aural alert. |
| GPWS FAIL | The GPWS function has failed. All or portions of the GPWS function are not available. Refer to the Cockpit Reference Guide for details. This alert is accompanied by a “GPWS System Failure” aural alert. This alert is only displayed in TAWS-A configurations. |
| TAWS N/A | Portions of the TAWS function are not available, depending on the failure cause. Refer to the Cockpit Reference Guide for details. |
| GLIDESLOPE | An excessive glideslope deviation has been detected by the TAWS. This alert is only displayed in TAWS-A configurations. |
| GLIDEPATH | An excessive glide path deviation has been detected by the TAWS. This alert is only displayed in TAWS-A configurations. |

| Display Flag / Indication | Description |
|---|---|
| **Traffic Collision and Avoidance System (TCAS)** (continued) | |
| TRAFFIC | Traffic Advisory (TA) is active. A potentially hazardous intruding aircraft has been detected and is closing to within 20-48 seconds of a potential collision area. In TCAS I installations, this visual alert is accompanied by an aural alert indicating the presence of traffic and relative bearing/altitude ("Traffic! 11 o'clock, high, six miles!"). In TCAS II installations, this visual alert is accompanied by a "Traffic! Traffic!" aural alert. |
| TCAS FAIL | The TCAS has failed. |
| TCAS STBY | The TCAS is in Standby mode during flight. |
| TA ONLY | TA mode has been selected by the flight crew or automatically engaged during takeoff or landing. During this mode, Resolution Advisories are inhibited. This selection is only available in TCAS II installations. |
| TCAS STBY | Standby mode has been selected by the flight crew while the aircraft is on ground. In flight the annunciation is amber. During this mode, all TCAS alerting functions are unavailable. |

| Display Flag / Indication | Description |
|---|---|
| **Windshear** | |
| WINDSHEAR | Windshear Caution indicating increasing performance windshear. This alert is accompanied by a repeating “Caution Windshear” aural alert. |

# DOORS

## AFT BAG DOOR UNSAFE

*The aft baggage door is not closed and latched with an engine running and the parking brake not set, on ground or in flight.*

### ON GROUND

1. Aft Baggage Door ........................................................ Close

--- END OF PROCEDURE ---

### DURING FLIGHT

1. Airspeed.................................................................... Reduce
2. Land at nearest suitable airport

--- END OF PROCEDURE ---

## CABIN DOOR UNSAFE

*The main cabin door is not closed and latched with an engine running and the parking brake not set, on ground or in flight.*

### ON GROUND

1. Main Cabin Door ........................................................... Close

--- END OF PROCEDURE ---

### DURING FLIGHT

1. Seatbelts........................................................... Verify fastened
2. CABIN SIGNS
   a. SEATBELTS....................................................... ON
3. Airspeed............................................................. Reduce
4. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher
5. Land at nearest suitable airport

--- END OF PROCEDURE ---

## EMER EXIT DOOR UNSAFE

*The Emergency Exit door is not closed and latched, on ground or in flight.*

**ON GROUND**

1. Emergency Exit Door........................Verify properly installed

--- END OF PROCEDURE ---

**DURING FLIGHT**

1. Emergency Exit Door Handle .............................Verify closed

***If EMER EXIT DOOR UNSAFE message remains***

2. Continue planned flight

**NOTE** The emergency exit door is a plug type door.

--- END OF PROCEDURE ---

## EXT PWR DOOR UNSAFE

*The external power door is not closed with an engine running and the parking brake not set.*

### ON GROUND

1. Do not taxi
2. External power cord ........................................Verify removed
3. External power door ........................................................Close

--- END OF PROCEDURE ---

### DURING FLIGHT

1. Continue planned flight

**NOTE** The external power door will remain closed due to airflow during flight.

--- END OF PROCEDURE ---

## FWD BAG DOOR UNSAFE

*The forward baggage door is not closed and latched with an engine running and the parking brake not set, on ground or in flight.*

### ON GROUND

1. Fwd Baggage Door........................................................ Close

--- END OF PROCEDURE ---

### DURING FLIGHT

1. Airspeed............................................................... Reduce
2. Land at nearest suitable airport

--- END OF PROCEDURE ---

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# ELECTRICAL SYSTEMS

## BATTERY BUS 1 FAIL

*Battery bus 1 is isolated from the aircraft electrical system*

1. PITCH TRIM MODE.................................................... STBY
2. Thrust Levers......................................Avoid rapid movements
3. Icing Conditions ...........................................................Exit
4. Left DISPLAY REVERSION ........................................ REV
5. Radio ...................................................................... COM 2

***CAUTION*** *Pilot will not hear intercom or alerts through headset, but alerts will be automatically routed to cross-side speaker. Speaker volume may need to be adjusted to ensure alerts can be heard while wearing headset.*

**┌ Procedure Continued ┐**

**BATTERY BUS 1 FAIL** (continued)

**NOTE** The pilot's handheld microphone and speaker are inoperative.

**NOTE** The pilot's boom mic, or oxygen mask mic is automatically routed to COM 2 for communication with ATC.

**NOTE** Marker beacon functionality (aural and visual) will be inoperative on the failed side.

6. Navigation ........................................................ NAV 2 or GPS

**NOTE** COM 2, NAV 2, and GPS are the only communication and navigation sources available during a Battery Bus 1 failure.

7. Transponder................. XPDR 2 (if applicable) or notify ATC
8. L ENGINE BLEED........................................................OFF
9. WING FLOW......................................................... FROM R
10. L WINDSHIELD HEAT..................................................OFF
11. Altitude.......................................Descend to FL 250 or below
12. NOSE WHEEL STEERING ...........................................OFF

┌ **Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

13. Select a long, wide, and dry runway with minimal crosswind

**WARNING** **Anti-skid is not functional. Any braking above light in wet runway conditions could result in blown tires and loss of directional control.**

**NOTE** Landing distance will double on a wet runway using light braking.

***CAUTION*** *Nosewheel steering is inoperative. Crosswinds should be minimized to ensure adequate directional control during the low-speed portion of the rollout using differential braking.*

14. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

**NOTE** Stall Pusher is inoperative. Low Speed Awareness remains operative in a degraded mode based on available valid ADC AOA data.

┌ **Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

**DESCENT**

1. Landing Field Elevation .......................................... Verify set
2. Altimeters (transition altitude) ........................................... Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing....................................................Complete
3. Avionics......................................................................... Set

┌**Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

4. Landing Data Set and confirmed
   a. Radios and Navigation ........................................ Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance.........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| UP | $V_{REF}$ + 20 | Add 105% |
| TO/APPR | $V_{REF}$ + 10 | Add 75% |
| LDG | $V_{REF}$ + 5 | Add 60% |

**NOTE** Flaps are inoperative during a Battery Bus 1 failure. The flap setting at the time the failure occurred will be the final flap setting.

**NOTE** Due to anti-skid and the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

**NOTE** Landing distance will double on a wet runway using light braking.

┌ **Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

5. CAS Messages ............................................................ Check
6. Approach Briefing .................................................. Complete

**BEFORE LANDING**

1. Landing Gear Alternate Extension
   a. LDG GEAR CTRL circuit breaker............PULL (B7)
   b. LANDING GEAR ................................................ DN
   c. Airspeed..................................... 150 KIAS minimum
   d. ALTERNATE GEAR RELEASE handle..... Pull fully
   e. Yaw airplane, if necessary, to obtain gear locked down
   f. LANDING GEAR indicator.... Verify three green DN

**NOTE** The gear DOOR icon will remain posted but a normal landing is possible without gear door - ground contact.

┌ **Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

g. ALTERNATE GEAR RELEASE handle ........... Stow

***CAUTION*** *The ALTERNATE GEAR RELEASE handle could interfere with thrust lever operation if not stowed following use.*

**NOTE** Normal landing gear operations cannot be restored in flight after activation of the alternate gear release.

2. Airspeed................................................(Flaps UP) - $V_{REF}$ + 20
(Flaps TO/APPR) - $V_{REF}$ + 10
(Flaps LDG) - $V_{REF}$ + 5
3. Yaw Damper........................................................ Disengage

┌ **Procedure Continued** ┐

**BATTERY BUS 1 FAIL** (continued)

**LANDING**

1. Thrust Levers.......................................................... IDLE
2. Brakes.................................................... Apply Gradually
3. Maintain directional control with rudder and differential braking

***CAUTION*** *Brakes must be applied gradually. Light to moderate braking can be applied without skidding tires on a dry surface, however, the pilot should consider runway surface conditions when applying brakes.*

**FOLLOWING LANDING ROLLOUT**

1. Do not taxi
2. Wheel chocks ........................................................ Install

***CAUTION*** *Following landing rollout, the emergency and brake accumulators may drop below the level required for braking.*

┌ **Procedure Continued** ┐

| The following equipment will be INOPERATIVE with a Battery Bus 1 failure | |
|---|---|
| **Communication** | |
| COM 1<br>Transponder 1 | L Audio |
| **Navigation / AFCS** | |
| Autopilot<br>AHRS 1 and ADC 1<br>Standby Instrument<br>Standby AHRS and ADC<br>ADF<br>TCAS<br>Radio Altimeter | L PFD<br>SiriusXM® Weather Datalink<br>NAV 1<br>L CDU<br>Weather Radar<br>SATCOM / Connext™ Weather<br>GPWS |
| **Engine** | |
| L Engine Instruments<br>L Fire Extinguisher | L Fire Detection |
| **Flight Control** | |
| Normal Pitch Trim<br>Roll and Yaw Trim<br>Stall Pusher | Stall Warning<br>Flaps<br>Speedbrake |
| **Landing Gear and Brakes** | |
| Landing Gear Control<br>Hydraulic Pump | Anti-Skid<br>Hydraulic Pump |
| **Fuel** | |
| L Fuel Pump<br>Left Fuel Quantity<br>Center Fuel Quantity | L Fuel Pump<br>Left Fuel Quantity<br>Center Fuel Quantity |
| **Environmental** | |
| L ENG Bleed (Ind.)<br>Cockpit Fan | L Eng Bleed Leak Detection |
| **Ice Protection** | |
| Ice Detector 1<br>Standby Probe Heat<br>L Probe Heat | L Engine Anti-ice (failed on)<br>L Wing Anti-ice<br>L Windshield Zone Heat |
| **Lighting** | |
| Cockpit Flood Light<br>L Landing Light<br>Ice Inspection Light(s)<br>Strobe Light<br>Footwell Lights | Cabin Signs<br>Beacon<br>Position Lights<br>R Taxi Light |

--- END OF PROCEDURE ---

## BATTERY BUS 1A FAIL

*Battery bus 1A has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR)............................... Reset if necessary

***If BATTERY BUS 1A FAIL message remains***

2. Thrust Levers.....................................Avoid rapid movements

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

3. Icing Conditions ...................................................................Exit
4. Left DISPLAY REVERSION ........................................ REV
5. Radio ........................................................................ COM 2

***CAUTION*** *Pilot will not hear intercom or alerts through headset, but alerts will be automatically routed to cross-side speaker. Speaker volume may need to be adjusted to ensure alerts can be heard while wearing headset.*

┌ **Procedure Continued** ┐

**BATTERY BUS 1A FAIL** (continued)

**NOTE** The pilot's handheld microphone and speaker are inoperative.

**NOTE** The pilot's boom mic, or oxygen mask mic is automatically routed to COM 2 for communication with ATC.

**NOTE** Marker beacon functionality (aural and visual) will be inoperative on the failed side.

6. Navigation ........................................................ NAV 2 or GPS

**NOTE** COM 2, NAV 2, and GPS are the only communication and navigation sources available during a Battery Bus 1A failure.

7. Transponder................. XPDR 2 (if applicable) or notify ATC
8. L ENGINE BLEED ........................................................ OFF
9. WING FLOW ........................................................ FROM R
10. Altitude....................................... Descend to FL 250 or below
11. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

**Procedure Continued**

**BATTERY BUS 1A FAIL** (continued)

**DESCENT**

1. Landing Field Elevation .......................................... Verify set
2. ENGINE ANTI-ICE ..............................................As required
3. Altimeters (transition altitude) .......................................... Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. CABIN SIGNS .....................................................As required
4. Avionics............................................................................ Set
5. Landing Data Set and confirmed
    a. Radios and Navigation .......................................... Set
    b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
    c. Landing Distance...........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

┌Procedure Continued┐

**BATTERY BUS 1A FAIL** (continued)

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

6. CAS Messages............................................................Check
7. Approach Briefing..................................................Complete
8. FLAPS ........................................................................TO/APPR

**BEFORE LANDING**

1. Landing Gear Alternate Extension
   a. LDG GEAR CTRL circuit breaker............PULL (B7)
   b. LANDING GEAR.................................................DN
   c. Airspeed ..................................... 150 KIAS minimum
   d. ALTERNATE GEAR RELEASE handle .... Pull fully
   e. Yaw airplane, if necessary, to obtain gear locked down
   f. LANDING GEAR indicator.... Verify three green DN

**NOTE** The gear DOOR icon will remain posted but a normal landing is possible without gear door - ground contact.

┌ **Procedure Continued** ┐

**BATTERY BUS 1A FAIL** (continued)

g. ALTERNATE GEAR RELEASE handle............ Stow

***CAUTION*** *The ALTERNATE GEAR RELEASE handle could interfere with thrust lever operation if not stowed following use.*

**NOTE** Normal landing gear operations cannot be restored in flight after activation of the alternate gear release.

2. FLAPS ...................................................................... LDG
3. Airspeed.............................................................. $V_{REF}$ + 5
4. Yaw Damper......................................................... Disengage

**LANDING**

1. Thrust Levers............................................................ IDLE
2. Brakes ...................................................................... Apply
3. SPEEDBRAKE (if installed)............................................ EXT

┌ **Procedure Continued** ┐

**BATTERY BUS 1A FAIL** (continued)

| **The following equipment will be INOPERATIVE with a Battery Bus 1A failure** | |
|---|---|
| **Communication** | |
| COM 1<br>L Audio | Transponder 1 |
| **Navigation / AFCS** | |
| L PFD<br>Stall Pusher<br>Standby Instrument<br>Standby AHRS and ADC<br>SiriusXM® Weather Datalink<br>TCAS<br>Radio Altimeter | L CDU<br>ADF<br>NAV 1<br>Control Yoke System Control and Scroll Wheel<br>Weather Radar<br>GPWS |
| **Engine** | |
| L Fire Detection | |
| **Landing Gear and Brakes** | |
| Landing Gear Control | |
| **Fuel** | |
| Left Fuel Quantity<br>R Fuel Pump Control (latches ON) | L Fuel Shutoff Valve |
| **Environmental** | |
| L Bleed Leak Detection | L Engine Bleed |
| **Ice Protection** | |
| L Wing Anti-ice | |
| **Lighting** | |
| Cockpit Flood Light<br>L Landing Light<br>NAV Lights<br>Right Taxi Light | Lighting Control 1<br>Ice Inspection Light(s)<br>Ground Beacon |

--- END OF PROCEDURE ---

## BATTERY BUS 1B FAIL

*Battery bus 1B has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR).............................. Reset if necessary

***If BATTERY BUS 1B FAIL message remains***

2. PITCH TRIM MODE.................................................STBY
3. Thrust Levers....................................Avoid rapid movements

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

4. WING FLOW......................................................... FROM R
5. Icing Conditions ..........................................................Exit
6. Left PFD......................................... Verify AHRS 2 selected
7. RVSM airspace..............................................................Exit
8. NOSE WHEEL STEERING ............................................OFF

┌ **Procedure Continued** ┐

**BATTERY BUS 1B FAIL** (continued)

9. Select a long, wide, and dry runway with minimal crosswind

WARNING **Anti-skid function is not available. Any braking above light in wet runway conditions could result in blown tires and loss of directional control.**

***CAUTION*** *Nosewheel steering is inoperative. Crosswinds should be minimized to ensure adequate directional control during the low-speed portion of the rollout using differential braking.*

**NOTE** Landing distance will double on a wet runway using light braking.

10. Land at nearest suitable airport

**NOTE** Stall Pusher is inoperative. Low Speed Awareness remains operative in a degraded mode based on available valid ADC AOA data.

**DESCENT**

1. Landing Field Elevation .......................................... Verify set
2. Altimeters (transition altitude) ........................................... Set

┌ **Procedure Continued** ┐

**BATTERY BUS 1B FAIL** (continued)

**APPROACH**

1. Seats and Seat Belts....................................Adjusted and secure
2. Passenger Briefing....................................................Complete
3. CABIN SIGNS .......................................................As required
4. Avionics........................................................................ Set
5. Landing Data Set and confirmed
    a. Radios and Navigation ............................................ Set
    b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
    c. Landing Distance..........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| UP | $V_{REF}$ + 20 | Add 105% |
| TO/APPR | $V_{REF}$ + 10 | Add 75% |
| LDG | $V_{REF}$ + 5 | Add 60% |

**NOTE** Flaps are inoperative during a Battery Bus 1B failure. The flap setting at the time the failure occurred will be the final flap setting.

┌ **Procedure Continued** ┐

**BATTERY BUS 1B FAIL** (continued)

**NOTE** Due to anti-skid and the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

**NOTE** Landing distance will double on a wet runway using light braking.

6. CAS Messages ........................................................ Check
7. Approach Briefing ................................................ Complete

**BEFORE LANDING**

1. Landing Gear ........................................................ DN
2. Airspeed ........................................ (Flaps UP) - $V_{REF}$ + 20
   (Flaps TO/APPR) - $V_{REF}$ + 10
   (Flaps LDG) - $V_{REF}$ + 5
3. Yaw Damper ........................................................ Disengage

**LANDING**

1. Thrust Levers ........................................................ IDLE
2. Brakes ........................................................ Apply Gradually

┌ **Procedure Continued** ┐

**BATTERY BUS 1B FAIL** (continued)

3. Use rudder and differential braking to maintain direction control

***CAUTION*** *Brakes must be applied gradually. Light to moderate braking can be applied without skidding tires on a dry surface, however, the pilot should consider runway surface conditions when applying brakes.*

4. SPEEDBRAKE (if installed)........................................... EXT

**FOLLOWING LANDING ROLLOUT**

1. Taxi to parking using differential braking

| **The following equipment will be INOPERATIVE with a Battery Bus 1B failure** | |
|---|---|
| **Navigation / AFCS** | |
| AHRS 1<br>Stall Pusher<br>TCAS RA Mode | AFCS Panel<br>Yaw Damper (once disengaged)<br>Flight Director |
| **Engine** | |
| L Fire Extinguisher | |
| **Flight Control** | |
| Pitch (normal), Roll and Yaw Trim | Flaps |
| **Landing Gear and Brakes** | |
| Anti-Skid | Nosewheel Steering |
| **Ice Protection** | |
| Ice Detector 1<br>Standby Probe Heat | L Engine Anti-ice (failed on) |
| **Lighting** | |
| L Landing Light | |

--- END OF PROCEDURE ---

## BATTERY BUS 1C FAIL

*Battery bus 1C has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR) .............................. Reset if necessary

***If BATTERY BUS 1C FAIL message remains***

2. RVSM airspace..........................................................Exit
3. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

4. L PFD ...............................................Verify ADC 2 selected

**PRIOR TO LANDING**

5. Final approach speed ............................................. $V_{REF} + 5$

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF} + 5$ | Add 10% |
| TO/APPR (ice) | $V_{REF} + 5$ | Add 10% |

┌ **Procedure Continued** ┐

## BATTERY BUS 1C FAIL (continued)

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

| The following equipment will be **INOPERATIVE** with a Battery Bus 1C failure | |
|---|---|
| **Navigation / AFCS** | |
| ADC 1 | SiriusXM® Weather Datalink |
| Stall Pusher | |
| **Environmental** | |
| Cockpit Fan | |
| **Lighting** | |
| Beacon | |

--- END OF PROCEDURE ---

## BATTERY BUS 2 FAIL

*Battery bus 2 is isolated from the aircraft electrical system.*

1. Thrust Levers.....................................Avoid rapid movements

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

2. Icing Conditions ..........................................................Exit
3. Radio ......................................................................... COM 1

**NOTE** Copilot will lose all communication capability.

4. Navigation ......................................................NAV 1 or GPS

**NOTE** COM 1, NAV 1, and GPS are the only communication and navigation sources available following a Battery Bus 2 failure.

**┌ Procedure Continued ┐**

**BATTERY BUS 2 FAIL** (continued)

5. PRESSURIZATION CONTROL MODE ..................... HOLD
6. R ENGINE BLEED ........................................................ OFF
7. WING FLOW ......................................................... FROM L
8. Altitude ...................................... Descend to FL 250 or below
9. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

**DESCENT**

1. Landing Field Elevation .......................................... Verify set
2. Altimeters (transition altitude) .......................................... Set

**APPROACH**

1. Seats and Seat Belts .................................. Adjusted and secure
2. Passenger Briefing .................................................. Complete
3. CABIN SIGNS ..................................................... As required
4. Avionics ....................................................................... Set

┌ **Procedure Continued** ┐

**BATTERY BUS 2 FAIL** (continued)

5. Landing Data Set and confirmed
   a. Radios and Navigation ........................................ Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

6. CAS Messages........................................................Check
7. Approach Briefing.................................................Complete
8. FLAPS ........................................................TO/APPR

**Procedure Continued**

**BATTERY BUS 2 FAIL** (continued)

## BEFORE LANDING

1. LANDING GEAR ........................................................ DN

**NOTE** Hydraulic pressure indications will be unavailable with a loss of Battery Bus 2, but the hydraulic pump will be operable.

2. Cabin Differential Pressure ................. Verify less than 0.3 psi
3. CABIN DUMP ....................................... DUMP (if required)

**WARNING** **The airplane must be unpressurized prior to landing.**

4. FLAPS ..................................................................... LDG
5. Airspeed............................................................. $V_{REF}$ + 5
6. Yaw Damper......................................................... Disengage

## LANDING

1. Thrust Levers........................................................... IDLE
2. Brakes ............................................Apply (after touchdown)

┌ **Procedure Continued** ┐

## BATTERY BUS 2 FAIL (continued)

| **The following equipment will be INOPERATIVE with a Battery Bus 2 failure** | |
|---|---|
| **Communication** | |
| CPDLC<br>R Audio | COM 2 |
| **Navigation / AFCS** | |
| MFD<br>NAV 2<br>DME | Stall Pusher<br>Weather Radar |
| **Engine** | |
| Right Engine Instruments<br>R Fire Extinguisher | R Fire Detection<br>Vibration Detection |
| **Flight Control** | |
| Standby Pitch Trim | Speedbrake |
| **Landing Gear and Brakes** | |
| Hydraulic (indication) | |
| **Fuel** | |
| R Fuel Low<br>R Fuel Quantity<br>R Fuel Pump | Fuel Crossfeed<br>R Fuel Shutoff Valve |
| **Environmental** | |
| Air Conditioner<br>R Engine Bleed<br>Pressure Control (normal) | R Bleed Leak<br>Cabin Oxygen Automatic Deployment<br>Cabin Fan |
| **Ice Protection** | |
| R Wing Anti-ice | R Engine Anti-ice (failed on) |
| **Lighting** | |
| Ice Inspection Light<br>Lighting Control 2<br>RECOG Lights<br>Logo Lights | Strobe Lights<br>L Taxi Light<br>Right Landing Lights |

--- END OF PROCEDURE ---

## BATTERY BUS 2A FAIL

*Battery bus 2A has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR)............................... Reset if necessary

***If BATTERY BUS 2A FAIL message remains***

2. Thrust Levers.....................................Avoid rapid movements

**CAUTION** When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

3. Icing Conditions ..............................................................Exit
4. Radio ........................................................................... COM 1
5. Navigation .......................................................NAV 1 or GPS

**NOTE** COM 1, NAV 1, and GPS are the only communication and navigation sources available following a Battery Bus 2A failure.

┌ **Procedure Continued** ┐

**BATTERY BUS 2A FAIL** (continued)

6. Transponder.................................................. Verify XPDR 1
7. R ENGINE BLEED........................................................OFF
8. WING FLOW..........................................................FROM L
9. Altitude.......................................Descend to FL 250 or below
10. Land at nearest suitable airport

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

**DESCENT**

1. Landing Field Elevation ......................................... Verify set
2. Altimeters (transition altitude) .......................................... Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing..................................................Complete
3. CABIN SIGNS .....................................................As required
4. Avionics.............................................................................. Set

┌ **Procedure Continued** ┐

**BATTERY BUS 2A FAIL** (continued)

5. Landing Data Set and confirmed
   a. Radios and Navigation .......................................... Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance..........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

6. CAS Messages.............................................................Check
7. Approach Briefing...................................................Complete
8. FLAPS ..........................................................................TO/APPR

**BEFORE LANDING**

1. LANDING GEAR ............................................................ DN
2. FLAPS ..........................................................................LDG
3. Airspeed.................................................................. $V_{REF}$ + 5
4. Yaw Damper.......................................................... Disengage

**┌ Procedure Continued ┐**

**BATTERY BUS 2A FAIL** (continued)

## LANDING

1. Thrust Levers........................................................... IDLE
2. Brakes..............................................Apply (after touchdown)
3. SPEEDBRAKE (if installed)..........................................EXT

| The following equipment will be INOPERATIVE with a Battery Bus 2A failure | |
|---|---|
| **Navigation / AFCS** | |
| Stall Pusher<br>NAV 2<br>Transponder 2 | COM 2<br>GPS 2 |
| **Engine** | |
| Right Engine Instruments | R Fire Detection |
| **Fuel** | |
| R Fuel Low<br>R Fuel Quantity | Fuel Crossfeed |
| **Environmental** | |
| R Engine Bleed | R Bleed Leak |
| **Ice Protection** | |
| R Wing Anti-ice | |

--- END OF PROCEDURE ---

## BATTERY BUS 2B FAIL

*Battery bus 2B has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR)............................... Reset if necessary

***If BATTERY BUS 2B FAIL message remains***

2. Thrust Levers.....................................Avoid rapid movements

**CAUTION** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

3. Icing Conditions ..............................................................Exit
4. WING FLOW ........................................................ FROM L
5. Left DISPLAY REVERSION ......................................... REV
6. Headset (right side)......................................................... Don

┌ **Procedure Continued** ┐

**BATTERY BUS 2B FAIL** (continued)

7. Speaker Volume (left side)............................................Adjust

***CAUTION*** *Copilot will not hear intercom or alerts through headset, but alerts will be automatically routed to cross-side speaker. Speaker volume may need to be adjusted to ensure alerts can be heard while wearing headset.*

**NOTE** The handheld microphone, speaker and oxygen mask mic on the right side are inoperative.

**NOTE** The audio system on the right side will default to use of the onside radio only at a fixed volume

8. Transponder.................................................... Verify XPDR 1
9. Land at nearest suitable airport

***CAUTION*** *Loss of data will suppress some subsequent failure indications including CAS alerts.*

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

┌ **Procedure Continued** ┐

**BATTERY BUS 2B FAIL** (continued)

**DESCENT**

1. Altimeters (transition altitude) .......................................... Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing..................................................Complete
3. CABIN SIGNS ....................................................As required
4. Avionics........................................................................ Set
5. Landing Data Set and confirmed
   a. Radios and Navigation ......................................... Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance..........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF} + 5$ | Add 10% |
| TO/APPR (ice) | $V_{REF} + 5$ | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

┌ **Procedure Continued** ┐

**BATTERY BUS 2B FAIL** (continued)

6. CAS Messages.............................................................Check
7. Approach Briefing.................................................Complete
8. FLAPS.........................................................TO/APPR

**BEFORE LANDING**

1. LANDING GEAR.............................................................DN

**NOTE** Hydraulic pressure indications will be unavailable with a failure of Battery Bus 2B, but the hydraulic pump will be operable.

2. FLAPS.............................................LDG or TO/APPR (ice)

***CAUTION*** *Do not extend the flaps to LDG unless the airframe can be confirmed free of ice and icing conditions are not expected during approach and landing.*

**NOTE** If TAWS-A is installed, the TAWS Warnings will annunciate when landing with Flaps at TO/APPR, unless Flap Override is selected.

3. Airspeed.......................................................... $V_{REF}$ + 5
4. Yaw Damper.................................................... Disengage

┌ **Procedure Continued** ┐

**BATTERY BUS 2B FAIL** (continued)

## LANDING

1. Thrust Levers.......................................................... IDLE
2. Brakes ...........................................Apply (after touchdown)

| The following equipment will be **INOPERATIVE** with a Battery Bus 2B failure | |
|---|---|
| **Communication** | |
| CPDLC | R Audio Functions |
| **Navigation / AFCS** | |
| MFD<br>Weather Radar<br>Stall Pusher<br>Transponder 2 | DME<br>TCAS RA Mode<br>GPS 2 |
| **Engine** | |
| R Fire Extinguisher | |
| **Flight Control** | |
| Speedbrake | STBY Pitch Trim |
| **Landing Gear and Brakes** | |
| Hydraulic Press (indication) | |
| **Environmental** | |
| Cabin Oxygen Automatic Deployment | |
| **Ice Protection** | |
| R Engine Anti-ice (failed on) | |
| **Lighting** | |
| Ice Inspection Light<br>Lighting Control 2<br>RECOG Light<br>Logo Lights | Strobe Lights<br>L Taxi Light<br>R Landing Light |

--- END OF PROCEDURE ---

## BATTERY BUS 2C FAIL

*Battery bus 2C has failed or is isolated from the aircraft electrical system.*

1. Solid State Relay (SSR) .............................. Reset if necessary

***If BATTERY BUS 2C FAIL message remains***

2. PRESSURIZATION CONTROL MODE..................... HOLD

**PRIOR TO LANDING**

3. Cabin Differential Pressure ................. Verify less than 0.3 psi
4. CABIN DUMP ........................................ DUMP (if required)

**WARNING** **The airplane must be unpressurized prior to landing.**

| **The following equipment will be INOPERATIVE with a Battery Bus 2C failure** | |
|---|---|
| **Communication** | |
| SATCOM / Connext[TM] Weather | TCAS RA Mode |
| **Environmental** | |
| Pressure Control (normal) | Cabin Fan |

--- END OF PROCEDURE ---

## BUS TIE FAIL

*Bus Tie has failed to achieve required state*

**ON THE GROUND**

1. Do not dispatch

--- END OF PROCEDURE ---

## L(R) GENERATOR FAIL

*The generator has failed*

1. GENERATOR (affected side)..................... OFF, then NORM

**NOTE** During ground operations, $N_2$ may need to be increased above 55% on the associated engine prior to cycling the generator switch to reset the generator.

**┌ Procedure Continued ┐**

## L(R) GENERATOR FAIL (continued)

***If GENERATOR FAIL message remains posted***

2. BUS TIE ........................................................ Verify Normal
3. GENERATOR (affected side) ........................................ OFF
4. Icing Conditions ............................................................ Exit

**NOTE** The left zone heating of both windshields is inoperative during single generator operations.

**NOTE** The air conditioning compressor is inoperative during single generator operations in the air.

5. Generator amps........................................................ Monitor

--- END OF PROCEDURE ---

## L(R) GENERATOR OVERLOAD

*Generator load is above allowable limits*

1. Generator load ........................................................... Reduce

**NOTE** The GCU will automatically trip offline due to an overcurrent. The trip point varies based on the amount of overcurrent and duration. A GCU trip is imminent anytime the **GENERATOR OVERLOAD** is posted.

--- END OF PROCEDURE ---

## MAIN BUS 1 FAIL

*Main Bus 1 has failed or is isolated from the airplane electrical system*

1. Icing Conditions ...............................................................Exit
2. L WINDSHIELD HEAT.................................................OFF
3. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

┌ **Procedure Continued** ┐

**MAIN BUS 1 FAIL** (continued)

4. L PFD ................................................ Ensure ADC 2 selected
5. RVSM airspace........................................................... Exit
6. Land at nearest suitable airport

**PRIOR TO LANDING**

7. Final approach speed ................................................ $V_{REF}$ + 5

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

| **The following equipment will be <u>INOPERATIVE</u> with a Main Bus 1 failure** | |
|---|---|
| **Navigation / AFCS** | |
| Stall Pusher | Weather Radar |
| TCAS | Autopilot |
| **Ice Protection** | |
| L Windshield Heat Zone | L Probe Heat |

--- END OF PROCEDURE ---

## MAIN BUS 2 FAIL

*Main Bus 2 has failed or is isolated from the airplane electrical system*

1. Icing Conditions ............................................................Exit
2. Radio ........................................................................ COM 1
3. R WINDSHIELD HEAT.................................................OFF
4. Transponder.................................................. Verify XPDR 1
5. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

6. RVSM airspace...............................................................Exit
7. Land at nearest suitable airport

**PRIOR TO LANDING**

8. Final approach speed ............................................. $V_{REF}$ + 5

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |

┌ **Procedure Continued** ┐

**MAIN BUS 2 FAIL** (continued)

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

| The following equipment will be INOPERATIVE with a Main Bus 2 failure | |
|---|---|
| **Communication** | |
| COM 2 | |
| **Navigation / AFCS** | |
| R PFD | R CDU |
| Stall Pusher | AHRS 2 and ADC 2 |
| CVFDR | ADF |
| DME | Transponder 2 |
| TCAS II | Radio Altimeter |
| | GPWS |
| **Ice Protection** | |
| R Windshield Heat Zone | Right Probe Heat |
| Ice Detector 2 | |
| **Lighting** | |
| Strobe Lights | Taxi Lights |
| Cockpit Map Lights | R Landing Light |
| Copilot Footwell Light | RECOG Lights |
| Lighting Control 1 | NAV Lights |

--- END OF PROCEDURE ---

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# ENGINES

## ENGINE AIRSTART

*An airborne restart of a shutdown engine is required*

***CAUTION*** *Do not attempt to restart an engine that has been shut down due to an engine fire or indicates obvious mechanical failures.*

***CAUTION*** *Ensure positive core rotation before attempting a relight. Positive $N_2$ or oil pressure >1 psi can be used to determine core rotation. If there is no indication of positive $N_2$ or oil pressure, the starter may be engaged as long as $N_2$ rotation is verified prior to moving the Thrust Lever out of CUT OFF.*

┌ **Procedure Continued** ┐

## ENGINE AIRSTART (continued)

### PRE-START

1. Thrust Lever (affected engine) ................................ CUT OFF
2. ENGINE ANTI-ICE (affected engine) .............................. OFF
3. Airspeed and Altitude ................................ Check within limits

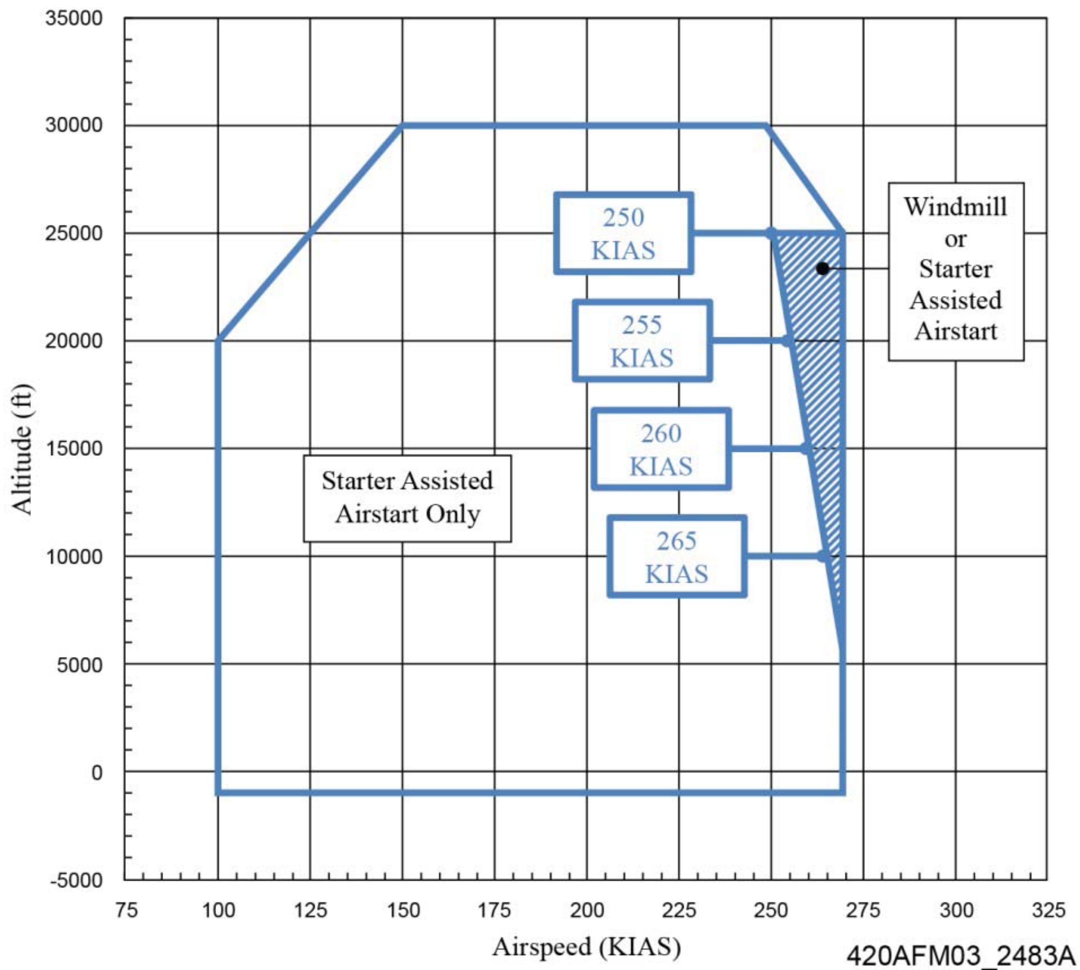


**Figure 12. Airstart Envelope**

**┌ Procedure Continued ┐**

## ENGINE AIRSTART (continued)

### STARTER ASSISTED AIRSTART

1. Engine START Switch (affected engine)........................Press
2. Thrust Lever (affected engine).......................................IDLE
3. Engine Instruments....................................................Monitor

**NOTE** The FADEC will not automatically abort an in-flight engine start. The pilot should abort the start if any of the following indications are observed:

- No ITT rise in 30 seconds
- No positive oil pressure indication within 10 seconds after $N_2$ increase
- Failure of $N_1$ or $N_2$ to accelerate to idle
- ITT approaching limit

Reference ENGINE START ABORT (Section 3A – Abnormal Procedures) as appropriate.

### WINDMILLING AIRSTART

1. FUEL PUMP (affected engine)..........................................ON
2. Thrust Lever (affected engine)........IDLE at 8% $N_2$ minimum
3. Engine Instruments....................................................Monitor

┌ **Procedure Continued** ┐

## ENGINE AIRSTART (continued)

**NOTE** The FADEC will not automatically abort an in-flight engine start. The pilot should abort the start if any of the following indications are observed:

- No ITT rise in 30 seconds
- No positive oil pressure indication within 10 seconds after $N_2$ increase
- Failure of $N_1$ or $N_2$ to accelerate to idle
- ITT approaching limit

Reference ENGINE START ABORT (Section3A – Abnormal Procedures) as appropriate.

### POST START

1. Thrust Lever (affected engine) ................................As required

**NOTE** If conditions permit, allow the engine to warm up at IDLE until the oil temperature is above 10 °C prior to selecting a higher thrust setting.

2. FUEL PUMP (affected engine).................................... NORM
3. ENGINE ANTI-ICE (affected engine)...................As required
4. WING FLOW............................................................... NORM
5. TCAS...................................................AUTO (TCAS II only)

--- END OF PROCEDURE ---

## ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT

*An inflight shutdown of an engine is required*

***CAUTION*** *Severe damage to the engine, and possibly the aircraft, may occur if engine operation is continued with a serious engine malfunction. A serious malfunction can be recognized by one or more of the following symptoms:*

- *Increase in engine vibration accompanied by higher than normal ITT or fuel flow*
- *Repeated or uncontrollable engine stalls*
- *Loss of thrust*
- *A shift in engine-to-engine parameters, or in the relationship of one parameter to another during steady-state operation*
- *Oil pressure increase or decrease of ±8 psid or more from the normal steady-state operating pressure, and/or an increase in oil temperature, or indications of oil filter bypass.*

**NOTE** If conditions permit with no abnormal engine indications, stabilize the engine at idle thrust for 2 minutes prior to shut down.

┌ **Procedure Continued** ┐

## ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT
(continued)

1. Thrust Lever (affected engine) ................................ CUT OFF

***CAUTION*** *To minimize the risk of rotor lock:*

- *Maintain airspeed above 140 KIAS to ensure core rotation.*
- *Following commanded or uncommanded inflight shutdown, maintain positive core rotation throughout the engine-out scenario. If core rotation has stopped, take action to achieve core rotation as soon as practical. Failure to maintain positive core rotation may preclude a successful start.*

**CAUTION** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

2. Fuel CROSSFEED ............................................... As required
3. WING FLOW .............................. FROM L(R) (operable side)
4. TCAS (TCAS II only) ............................................ TA ONLY
5. ENGINE ANTI-ICE (affected engine).............................. OFF

**┌ Procedure Continued ┐**

## ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT
(continued)

6. Altitude ........................................................FL 250 or below

**NOTE** The left zone heating of both windshields is inoperative during single generator operations.

7. Accomplish ENGINE AIRSTART (Section 3A – Abnormal Procedures) or SINGLE-ENGINE APPROACH AND LANDING (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG START FAIL

## ENGINE START ABORT

*The FADEC has detected a starting abnormality or has automatically aborted a ground engine start, or the pilot has detected a reason to abort the start attempt.*

### GROUND OR STARTER ASSISTED AIRSTART

1. Thrust Lever (affected engine) ................................. CUT OFF

**NOTE** For a pilot initiated start abort on the ground, the START icon and start ITT limits will remain displayed for 60 seconds after the thrust lever is selected to CUT OFF.

***If ITT rise observed or ITT is above 120 °C***

2. Engine START Switch (affected engine)......................... Press

***CAUTION*** *If the ENGINE START ABORT is performed after the starter is disengaged, allow $N_2$ to decrease below 45% before energizing the starter for motoring or a subsequent start attempt.*

┌ **Procedure Continued** ┐

**L(R) ENG START FAIL** (continued)

## ENGINE START ABORT (continued)

3. Engine Indications ..................................... Verify ITT decrease
4. Engine PUSH TO DISC ..................................................Press
5. Accomplish SHUTDOWN (Section 4 – Normal Procedures) or ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section3A – Abnormal Procedures) as appropriate

--- END OF PROCEDURE ---

## WINDMILLING AIRSTART

1. Thrust Lever (affected engine) ................................ CUT OFF
2. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## ENGINE TAILPIPE FIRE AFTER SHUTDOWN

*Engine ITT does not decrease after shutdown indicating a tailpipe fire*

1. Thrust Lever (affected engine) ......................Verify CUT OFF

***If ITT rise observed***

2. Engine START Switch (affected engine)..........................Press
3. Engine Indications....................................Verify ITT decrease
4. Engine PUSH TO DISC ..................... Press (after 30 seconds)

--- END OF PROCEDURE ---

## L(R) ENG CONTROL FAIL

*The FADEC has detected a loss of thrust control*

**ON GROUND**

1. Thrust Lever (affected engine) ................................ CUT OFF
2. ENGINE FIRE PUSH Switch (affected engine) .............. LIFT COVER AND PUSH

--- END OF PROCEDURE ---

**IN FLIGHT**

1. Thrust Lever (responsive engine) .......................... As required
2. Fuel CROSSFEED ................................................ As required

**WHEN AIRCRAFT IS IN A POSITION TO LAND**

3. Thrust Lever (affected engine) ................................ CUT OFF
4. ENGINE FIRE PUSH Switch (affected engine) .............. LIFT COVER AND PUSH
5. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG CONTROL FAULT

*The FADEC has detected a fault that may result in degraded engine response.*

**ON GROUND**

1. Do not dispatch

--- END OF PROCEDURE ---

**IN FLIGHT**

1. WING FLOW .............................. FROM L(R) (operable side)

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active on a single bleed source until WING FLOW is selected from the operable side.

***If ENG CONTROL FAULT is still illuminated***

2. Thrust Lever (affected engine) ...........Avoid rapid movements
3. Engine Indications (affected engine)........................... Monitor
4. Land at nearest suitable airport

--- END OF PROCEDURE ---

## L-R ENG FUEL BYPASS

*An impending bypass of the fuel filters on both engines has been detected.*

1. Thrust Levers.....................................Avoid rapid movements
2. Land at nearest suitable airport

**NOTE** The **ENG FUEL BYPASS** message will post for an impending bypass condition. The filter has been designed to allow for continued engine operation during the diversion to a suitable landing airport even with a maximum expected level of fuel contamination.

**NOTE** High differential pressure across the fuel filter is most likely to occur at high power settings such as takeoff, and the message may self clear after power is reduced. If the message posts and then clears after takeoff, notify maintenance after landing.

--- END OF PROCEDURE ---

## L(R) ENG OIL TEMP HIGH

*Engine oil temperature is above normal limits.*

***If high oil temperature occurs after a thrust reduction***

1. Thrust Lever (affected engine) ................. Advance, if possible

***If high oil temperature occurs with engine at high thrust***

1. Thrust Lever (affected engine) ....................................... Retard

***If ENG OIL TEMP HIGH message remains or other abnormal engine indications are present***

2. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) ENG OVERSPD PROT FAIL

*The FADEC has detected a failure of the overspeed protection system.*

1. Thrust Lever (affected engine) ........................................ IDLE
2. Engine indications (affected engine) ........................... Monitor

***If engine indications remain within limits***

3. Thrust Lever (affected engine) ......................Maintain at IDLE
4. FUEL CROSSFEED ........................................... As Required
5. WING FLOW.............................. FROM L(R) (operable side)

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

6. TCAS (TCAS II only) ............................................TA ONLY
7. Land at nearest suitable airport
8. Accomplish SINGLE-ENGINE APPROACH AND LANDING (Section 3A – Abnormal Procedures)

┌ **Procedure Continued** ┐

## L(R) ENG OVERSPD PROT FAIL (continued)

***If un-commanded acceleration of affected engine occurs***

9. Thrust lever (affected engine) .................................CUT OFF
10. Land at nearest suitable airport
11. Accomplish ENGINE PRECAUTIONARY SHUTDOWN IN FLIGHT (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) FIRE DETECTOR FAIL

*The associated fire detection system has failed.*

***If ENGINE FIRE indications were present prior to the failure***

1. Consider fire still burning
2. Land at nearest suitable airport

--- END OF PROCEDURE ---

***If ENGINE FIRE indications were not present prior to the failure***

1. Engine Indications (affected side)..............................Monitor
2. Continue planned flight

--- END OF PROCEDURE ---

# ENVIRONMENTAL / PRESSURIZATION SYSTEMS

## CRACKED WINDSHIELD OR WINDOW

*A cracked or shattered windshield or window has been detected.*

1. Airspeed.................................................200 KIAS maximum
2. Descend to 15,000 ft MSL or Minimum Safe Altitude, whichever is higher
3. Land at nearest suitable airport

--- END OF PROCEDURE ---

## CABIN ALT CTRL FAIL

*The Cabin Pressurization system automatic operation has failed.*

1. PRESSURIZATION CONTROL MODE..................... HOLD

**PRIOR TO LANDING**

2. CABIN DUMP ..........................................................DUMP

**WARNING** **The airplane must be unpressurized prior to landing.**

--- END OF PROCEDURE ---

## CABIN ALT CTRL FAULT

*A fault has been detected which affects the cabin dump function.*

**FOLLOWING LANDING**

1. CABIN DUMP ............................................................DUMP

**WARNING** **The pressurization controller may not be able to ensure all residual cabin pressure is dumped following landing.**

**NOTE** The first motion of the main entry door handle operates a small pressure relief valve which will release any residual pressure.

--- END OF PROCEDURE ---

## CABIN ALT HIGH FIELD

*The Cabin Pressurization system has been operating in the High Field Mode for more than 30 minutes.*

1. Oxygen Mask ..................................................Don as required

--- END OF PROCEDURE ---

## L(R) CABIN BLEED FAIL

*There has been a failure of the cabin bleed system.*

1. CABIN INFLOW (affected side) ...................................... OFF
2. Altitude ....................................... Descend to FL 250 or below

--- END OF PROCEDURE ---

## CABIN OXYGEN OFF

*Cabin oxygen is off and cabin altitude is greater than 15,500 ft.*

***If passengers occupy the cabin***

1. CABIN OXYGEN ........................................... DROP MASK

--- END OF PROCEDURE ---

## L(R) CABIN BLEED TEMP HIGH

*The cabin bleed temperature is above normal operating limits when operating in Manual Mode.*

***If L CABIN BLEED TEMP HIGH message is posted***

1. CABIN TEMP .................................. Press COLD and release (3-5 times)

**NOTE** The COLD button must be released for approximately one second prior to each subsequent re-selection.

***If R CABIN BLEED TEMP HIGH message is posted***

1. COCKPIT TEMP .............................. Press COLD and release (3-5 times)

***If L(R) CABIN BLEED TEMP HIGH message remains posted***

2. CABIN INFLOW (affected side) ...................................... OFF
3. Altitude ....................................... Descend to FL 250 or below

--- END OF PROCEDURE ---

## ECS AIR COND FAIL

*The Temperature Control system has detected a failure of the automatic system.*

1. ECS MODE.........................................................MANUAL
2. COCKPIT TEMP ..................................................As required
3. CABIN TEMP......................................................As required

--- END OF PROCEDURE ---

## ECS GND COOLING FAN FAIL

*Ground cooling fan has failed to operate when commanded.*

**ON GROUND**

1. CABIN INFLOW .................................................... Both OFF
2. Dispatch per MEL

--- END OF PROCEDURE ---

## L(R) ENG BLEED FAIL

*There has been a failure of the bleed system, or the aircraft was powered up with a high bleed manifold temperature.*

### ON GROUND

1. Associated bleed manifold temperature ......................... Check

**NOTE** The **L(R) ENG BLEED FAIL** may post on the ground following power-up if the associated bleed manifold temperature is 75 °C or greater. In this case, the message may clear by de-powering the aircraft and allowing the manifold temperature to cool prior to re-powering.

--- END OF PROCEDURE ---

┌ **Procedure Continued** ┐

**L(R) ENG BLEED FAIL** (continued)

**DURING FLIGHT**

1. ENGINE BLEED (affected side) ..................................... OFF

***CAUTION*** *When operating on a single engine bleed with wing anti-ice ON above FL 340, large or sudden thrust changes may result in an ITT exceedance.*

**NOTE** The **L(R) ENG CONTROL FAULT** message may post if wing anti-ice is active until WING FLOW is selected from the operable side.

2. WING FLOW ............................. FROM R(L) (operable side)
3. Altitude ....................................... Descend to FL 250 or below

--- END OF PROCEDURE ---

## NO LDG FIELD ELEV

*The Cabin Pressurization system does not have landing field elevation information.*

1. Enter flight plan destination or manually enter landing field elevation

***If NO LDG FIELD ELEV message remains***

2. PRESSURIZATION CONTROL MODE..................... HOLD

**PRIOR TO LANDING**

3. CABIN DUMP ............................................................DUMP

**WARNING** **The airplane must be unpressurized prior to landing.**

--- END OF PROCEDURE ---

## OXYGEN LOW

*Oxygen quantity is less than 465 liters.*

1. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher
2. Oxygen quantity ........................................................ Monitor
3. CABIN OXYGEN.........................................................OFF

**NOTE** The CABIN OXYGEN knob is mechanical and may be difficult to move to the OFF position.

4. Land at nearest suitable airport

--- END OF PROCEDURE ---

## OXYGEN QTY FAIL

*The oxygen pressure transducer is indicating out of range.*

1. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher
2. Land at nearest suitable airport

--- END OF PROCEDURE ---

## OXYGEN UNAVAILABLE

*Oxygen quantity is depleted.*

1. OXYGEN SUPPLY ................................................ Verify ON

***If OXYGEN UNAVAILABLE message remains***

2. Descend to 10,000 ft MSL or Minimum Safe Altitude, whichever is higher
3. Land at nearest suitable airport

--- END OF PROCEDURE ---

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# FLIGHT CONTROLS

## FLAP FAIL

*The flap system has reported a failure.*

1. Flaps are inoperative

***CAUTION*** *If the flap position is unknown, limit inflight speed to 160 KIAS and assume the flaps are UP for subsequent landing.*

***CAUTION*** *If the avionics system is unable to determine flap position, the* **STALL PUSHER FAIL** *message will post in combination with this message. Adjustments to the landing speed and distance must be applied for both failures.*

2. Accomplish REDUCED FLAP LANDING (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## FLAP FAULT

*The flap system has reported a fault or has been powered for three days without performing the Built-In Test.*

### ON GROUND

1. In some circumstances, the fault may be cleared by cycling aircraft power.

--- END OF PROCEDURE ---

### DURING FLIGHT

1. FLAPS ........................................................ Monitor operation

--- END OF PROCEDURE ---

## PITCH TRIM FAIL

*The primary pitch trim has failed, or a stuck switch has been detected.*

**NOTE** In case of a stuck switch, autopilot may continue to function, and pitch trim functionality may be available from the other switch.

1. AUTOPILOT.......................................................... Disengage
2. PITCH TRIM MODE......................Cycle STBY then NORM

***If pitch trim remains failed***

3. PITCH TRIM MODE..................................................STBY
4. Adjust trim by use of the STANDBY PITCH switch

**NOTE** The autopilot will not be available with a primary pitch trim failure.

5. RVSM airspace.................................................................Exit

--- END OF PROCEDURE ---

## SPEEDBRAKE EXTENDED

*Speedbrake is not fully closed when commanded to close.*

1. SPEEDBRAKE Lever ....................................................... RET

***If SPEEDBRAKE EXTENDED is still posted***

2. Land at nearest suitable airport

***CAUTION*** *Range will be reduced with the speedbrake extended. FMS fuel planning information is based on current flight conditions and may be beneficial to determine available range.*

--- END OF PROCEDURE ---

# FUEL SYSTEMS

## FUEL CROSSFEED

*Fuel Crossfeed has been selected for more than 5 minutes with both engines running, or for 15 minutes with only one engine running.*

1. Fuel Quantity...........................Monitor for excessive decrease

***If fuel leak is suspected***

2. FUEL CROSSFEED .................................................. NORM
3. Land at nearest suitable airport

--- END OF PROCEDURE ---

## FUEL CROSSFEED FAIL

*Fuel crossfeed has been selected but is not functioning.*

1. FUEL PUMP ............................................Verify both NORM
2. FUEL CROSSFEED .................. Select NORM for 2 seconds, then reselect desired direction

***If FUEL CROSSFEED FAIL message remains***

3. FUEL PUMP ............................... To side OFF, From side ON

┌ **Procedure Continued** ┐

**FUEL CROSSFEED FAIL** (continued)

***If FUEL CROSSFEED FAIL message remains***

4. FUEL PUMP ....................................................Both NORM
5. FUEL CROSSFEED .................................................. NORM
6. Fuel Quantity ............................................................ Monitor
7. Thrust Levers.................................... Use asymmetric thrust to maintain fuel balance

--- END OF PROCEDURE ---

## FUEL IMBALANCE

*A 100 lb fuel imbalance between the left and right wing tanks has been detected*

1. FUEL CROSSFEED ....Select to side with lower fuel quantity

***When FUEL IMBALANCE indication clears***

2. FUEL CROSSFEED .................................................. NORM

**NOTE** An emergency fuel imbalance of 600 pounds has been demonstrated for safe return and landing.

┌ **Procedure Continued** ┐

**FUEL IMBALANCE** (continued)

**NOTE** If a crosswind landing is required with a fuel imbalance greater than 100 lbs, select a runway with the crosswind from the heavy wing side.

--- END OF PROCEDURE ---

## FUEL LEVEL CTRL FAULT

*A fault has been detected in the fuel level control system.*

1. Avoid rapid rolling and abrupt pitching maneuvers
2. Land at nearest suitable airport

--- END OF PROCEDURE ---

## L-R FUEL PRESSURE LOW

*Fuel pressure is below minimum allowable limits for both engines.*

1. FUEL PUMP (both) ........................................................ ON

***If FUEL PRESSURE LOW message remains***

2. THRUST LEVER (affected engine)......................... Minimum practical setting
3. Altitude............................... Maintain 20,000 ft MSL or below
4. Land at nearest suitable airport

--- END OF PROCEDURE ---

## L(R) FUEL PRESSURE LOW

*Fuel pressure is below minimum allowable limits.*

1. FUEL PUMP (affected side) .............................................. ON

***If FUEL PRESSURE LOW message remains***

2. THRUST LEVER (affected engine)......................... Minimum practical setting
3. Altitude............................... Maintain 20,000 ft MSL or below
4. Land at nearest suitable airport

--- END OF PROCEDURE --

## L(R) FUEL PUMP FAIL

*Fuel pump has failed to function as commanded.*

1. Solid State Relay (SSR) .............................. Reset if necessary

***If FUEL PUMP FAIL message remains and is accompanied by FUEL QUANTITY LOW indication***

2. FUEL PUMP (affected side) .............................................ON

**NOTE** If the **FUEL PUMP FAIL** indication remains, indicated fuel quantity below 20 lbs is unusable on the affected side.

--- END OF PROCEDURE ---

## FUEL QTY FAULT

*A failure of fuel quantity system has been detected which affects the left, right, or center fuel quantity indication.*

1. Indicated Fuel Quantity .......Check to determine failed system

***CAUTION*** *A* **FUEL QTY FAULT** *which affects the left or right wing tanks will cause the associated* **FUEL QTY LOW** *message to delay posting until the wing tank fuel quantity is as low as 110 lbs.*

**NOTE** Faults affecting the fuel quantity indication may also affect the Fuel Used information on the Fuel Synoptic page, and Fuel Remaining indications of the Weight and Balance Information on the CDU.

┌ **Procedure Continued** ┐

**FUEL QTY FAULT** (continued)

***If all fuel tank quantities are still displayed, or the center tank fuel quantity is invalid (“----“)***

2. Avoid rapid rolling and abrupt pitch maneuvers
3. Land at nearest suitable airport

***CAUTION*** *If all fuel tank quantities are still displayed, faults may be affecting one or more fuel tanks. All fuel quantity information should be considered inaccurate.*

***If L or R fuel tank quantities are displayed as invalid (“----“)***

2. Replan flight as necessary

**NOTE** Displayed fuel quantity information is valid and can be assumed to be available for inflight planning.

--- END OF PROCEDURE ---

## L-R FUEL QTY LOW

## L(R) FUEL QTY LOW

*Approximately 220 lbs or less of fuel remains in one or both wings based on either the optical low level sensor, or the fuel quantity indicator.*

***CAUTION*** *A* **FUEL QTY FAULT** *which affects the left or right wing tanks will cause the associated* **FUEL QTY LOW** *message to delay posting until the wing tank fuel quantity is as low as 110 lbs.*

1. Land at nearest suitable airport

--- END OF PROCEDURE ---

## FUEL TEMP HIGH

*The left and/or right wing fuel temperature is above 60 °C.*

**ON THE GROUND**

1. Do not dispatch

--- END OF PROCEDURE ---

**IN FLIGHT**

1. FUEL PUMP (affected side) ...............................................ON

***If FUEL TEMP HIGH message remains***

2. Land at nearest suitable airport

--- END OF PROCEDURE ---

## FUEL TEMP LOW

*The left and/or right wing fuel temperature is below -40 °C.*

1. FUEL PUMP (affected side) .............................................. ON
2. Aircraft altitude .................................... Descend to warmer air

--- END OF PROCEDURE ---

# HYDRAULIC SYSTEMS

## HYD PUMP FAIL

*The Hydraulic Pump has failed.*

1. Hydraulic pressure.................................................... Monitor

--- END OF PROCEDURE ---

## HYD PRESSURE LOW

*Main system hydraulic pressure is below allowable limits.*

1. Hydraulic pressure.................................................... Monitor
2. Speedbrake (if installed)....................................Do not extend
3. Land at nearest suitable airport

**PRIOR TO LANDING**

4. Accomplish ALTERNATE GEAR RELEASE EXTENSION (Section 3A – Abnormal Procedures)

┌ **Procedure Continued** ┐

**HYD PRESSURE LOW** (continued)

## AFTER TOUCHDOWN

5. Normal braking and steering are operable using accumulator pressure

## FOLLOWING LANDING ROLLOUT

6. Do not taxi

***CAUTION*** *Following landing rollout, the emergency and brake accumulators may drop below the level required for nosewheel steering and braking.*

--- END OF PROCEDURE ---

# ICE PROTECTION SYSTEMS

## L(R) ENG ANTI-ICE FAIL

*The engine anti-ice system has failed.*

### ON GROUND

1. ENGINE ANTI-ICE (affected engine)..............................OFF

***If ground icing conditions are present***

2. Thrust lever (affected engine) .................................CUT OFF
3. Do not dispatch

--- END OF PROCEDURE ---

### DURING FLIGHT

1. ENGINE ANTI-ICE (affected engine)..............................OFF
2. Icing Conditions .................................................................Exit

--- END OF PROCEDURE ---

## ICE DETECT FAIL

*Both ice detectors have failed.*

1. Icing Conditions ..............................................................Exit

***CAUTION*** *With a failure of the ice detectors, windshield high heat mode is not available, and the windshield heat may not provide sufficient anti-icing of the windshield.*

**NOTE** When the ice detectors are failed, icing conditions are defined as a SAT of 5 °C to -40 °C in visible moisture.

2. Select a landing airport free of icing conditions for approach and landing

***If icing conditions are inadvertently encountered***

1. ICE PROTECTION (ON)
    a. WING ANTI-ICE................................................. ON

**NOTE** Monitor ITT during operation of wing anti-ice.

┌ **Procedure Continued** ┐

## ICE DETECT FAIL (continued)

b. ENG ANTI-ICE ....................................................ON

c. TAIL DE-ICE.......................................................ON

**NOTE** Ice protection must remain ON for a minimum of 3 minutes after exiting icing conditions.

**NOTE** When the ice detectors are failed, icing conditions are defined as a SAT of 5 °C to -40 °C in visible moisture.

***If an approach and landing must be made through icing conditions***

1. Select longest, widest runway available
2. Adjust pilot seat in order to look through the lower forward portion of the side window

***CAUTION*** *With a failure of the ice detectors, windshield high heat mode is not available and the windshield heat may not provide sufficient anti-icing of the windshield.*

3. Use copilot, if available, to adjust power during approach
4. Avoid left crosswind if possible for single pilot operations

┌ **Procedure Continued** ┐

**ICE DETECT FAIL** (continued)

**DESCENT**

1. Landing Field Elevation ........................................ Verify set
2. ICE PROTECTION (ON)
   a. WING ANTI-ICE ................................................ ON

**NOTE** Monitor ITT during operation of wing anti-ice.

   b. ENG ANTI-ICE ................................................ ON
   c. TAIL DE-ICE ...................................................... ON
3. Altimeters (transition altitude) .......................................... Set

**APPROACH**

1. Seats and Seat Belts ................................. Adjusted and secure
2. Passenger Briefing ................................................... Complete
3. CABIN SIGNS ..................................................... As required
4. Avionics .................................................................... Set
5. Landing Data Set and confirmed
   a. Radios and Navigation .......................................... Set
   b. V-speeds, FMS, and Flight Guidance .................... Set, programmed, and modes selected
   c. Landing Distance .......................................... Confirm

┌ **Procedure Continued** ┐

**ICE DETECT FAIL** (continued)

**NOTE** With the wing anti-ice ON, the **STALL WARN ICE ADVANCE** message will post. Do not fly slower than the approach reference speed (green circle). Refer to Uncorrected Landing Field Length, Flaps TO/APPR – Icing (Section 5 – Performance).

6. CAS Messages........................................................... Check
7. Approach Briefing................................................... Complete
8. FLAPS.................................................................. TO/APPR
9. TAWS Warnings….. ....................................... Flap Override

**BEFORE LANDING**

1. LANDING GEAR........................................................... DN
2. SPEEDBRAKE (if installed)........................................... RET
3. Airspeed................................................................... $V_{REF}$
4. Autopilot/Yaw Damper .......................................... Disengage

**LANDING**

1. At approximately 300 ft AGL, transition to visual reference looking out side window
2. Thrust Levers............................................................ IDLE
3. Land with minimum flare

┌ **Procedure Continued** ┐

**ICE DETECT FAIL** (continued)

4. Brakes ............................................ Apply (after touchdown)
5. SPEEDBRAKE (if installed) ........................................ EXT

--- END OF PROCEDURE ---

## ICE PROT NOT ACTIVE

*Ice detected and one or more protection systems are not active.*

**ON GROUND**

1. ICE PROTECTION (ON and NORM)
   a. WING ANTI-ICE ................................................ ON

**NOTE** Monitor ITT during operation of wing anti-ice.

   b. ENGINE ANTI-ICE ............................................ ON
   c. TAIL DE-ICE ...................................................... ON
   d. WINDSHIELD HEAT .................................. NORM

┌ **Procedure Continued** ┐

**ICE PROT NOT ACTIVE** (continued)

**IN FLIGHT**

1. ICE PROTECTION (ON and NORM)
   a. WING ANTI-ICE....................................................ON

**NOTE** Wing anti-ice will not activate automatically above FL 340 when the wing anti-ice switch is in the NORM position, and it must be manually selected on for flight in icing conditions above FL 340.

**NOTE** Monitor ITT during operation of wing anti-ice.

   b. ENGINE ANTI-ICE...............................................ON
   c. TAIL DE-ICE........................................ NORM or ON
   d. WINDSHIELD HEAT .................................... NORM

***If message does not clear***

2. Icing Conditions ...............................................................Exit

--- END OF PROCEDURE ---

## L(R) PROBE HEAT FAIL

*The associated air data probe heater has failed or is not powered.*

1. PFD (affected side)................................ Select operable ADC
2. RVSM airspace.............................................................Exit
3. Do not perform intentional stalls

**NOTE** Stall Pusher is inoperative. Stall Warning remains operative based on remaining ADC AOA data.

**PRIOR TO LANDING**

4. Final approach speed..............................................$V_{REF}$ + 5

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ + 5 | Add 10% |
| TO/APPR (ice) | $V_{REF}$ + 5 | Add 10% |

**NOTE** Due to the stall pusher being inoperative, the minimum approach speed and landing distance factor are defined in the table.

--- END OF PROCEDURE ---

## STBY PROBE HEAT FAIL

*The standby air data probe heater has failed or is not powered.*

1. Disregard standby instrument air data

--- END OF PROCEDURE ---

## TAIL DE-ICE FAIL

*The tail de-ice system has failed.*

1. Solid State Relay (SSR) .............................. Reset if necessary

***If TAIL DE-ICE FAIL message remains***

2. Icing Conditions ..........................................................Exit

--- END OF PROCEDURE ---

## WING ANTI-ICE FAIL

*Wing anti-ice system pre-flight test has failed, wing anti-ice has failed, or wing bleed air leak detection has failed.*

### ON GROUND

1. WING ANTI-ICE ............................................................ OFF

**NOTE** The wing anti-ice system performs a self-test after the second engine is started on the ground. If an engine is subsequently shut down or manifold pressure did not remain above 10 psi during the self-test, the **WING ANTI-ICE-FAIL** message will post. In this case, the message can be cleared by shutting down the engines and cycling aircraft power off and back on again.

--- END OF PROCEDURE ---

### IN THE AIR

1. WING ANTI-ICE ............................................................ OFF
2. Icing Conditions ............................................................ Exit

***If wing protected surfaces cannot be confirmed to be free of ice, or icing conditions are expected during approach or landing***

3. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## WING ANTI-ICE FAIL ON

*Wing anti-ice system has failed on.*

1. Icing Conditions ................................................................Exit
2. WING ANTI-ICE ............................................................OFF

***If WING ANTI-ICE FAIL ON message remains posted***

3. Continue with planned flight

**FOLLOWING LANDING**

4. ENGINE BLEED .................................................... Both OFF

--- END OF PROCEDURE ---

## L(R) WING ANTI-ICE OVERHEAT

*An overheat has been detected in the associated wing anti-ice system.*

1. WING FLOW.......................... FROM R(L) (opposite engine)

***If L(R)WING ANTI-ICE OVERHEAT message remains***

2. Icing Conditions ..............................................................Exit
3. WING ANTI-ICE.............................................................OFF

***If wing protected surfaces cannot be confirmed to be free of ice, or icing conditions are expected during approach or landing***

4. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L-R WING A/I TEMP LOW

*The wing anti-ice system is operating at a lower than expected temperature.*

**NOTE** Operation of wing anti-ice is not required when SAT is below -40 °C. The **L-R WING A/I TEMP LOW** message may post if the system is operated in these conditions.

**NOTE** Monitor ITT during operation of wing anti-ice.

**NOTE** Stall warning ice advance will go to the failure schedule after one minute in icing conditions with the **L-R WING A/I TEMP LOW** message posted.

1. Thrust Levers............................ Increase (Minimum 62% $N_1$)

**NOTE** If thrust was set below 62% $N_1$, it may take up to three minutes for the system to warm up sufficiently to clear the message.

**NOTE** Posting of the **L-R WING A/I TEMP LOW** message may occur if operating in icing conditions outside the approved envelope. However, if the message does not clear within approximately one minute after exiting icing conditions, a system failure is likely and further icing encounters must be avoided.

┌ **Procedure Continued** ┐

**L-R WING A/I TEMP LOW** (continued)

***If L-R WING A/I TEMP LOW message remains posted***

2. Icing Conditions ..........................................................Exit
3. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If L-R A/I TEMP LOW message clears***

2. Continue flight in icing conditions as required

o ***When clear of icing conditions***

***CAUTION*** *Do not attempt more than one reset of the* **STALL WARN ICE ADVANCE**. *Multiple occurrences of the* **L-R WING A/I TEMP LOW** *message likely indicates a system failure.*

3. Stall Warn Ice Advance Reset ....................................... Select
4. WING ANTI-ICE ............................................................. ON

**NOTE** Operate wing anti-ice until the **STALL WARN ICE ADVANCE** message posts (approximately one minute).

┌ **Procedure Continued** ┐

**L-R WING A/I TEMP LOW** (continued)

5. WING ANTI-ICE ........................................................ NORM

--- END OF PROCEDURE ---

- ***If icing conditions expected through approach and landing***

3. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) WING ANTI-ICE TEMP LOW

*The affected wing anti-ice system is operating at a lower than expected temperature.*

**NOTE** Operation of wing anti-ice is not required when SAT is below -40 °C. If the system is operated in these conditions, the **L(R) WING ANTI-ICE TEMP LOW** message may post.

**NOTE** Monitor ITT during operation of wing anti-ice.

**NOTE** Stall warning ice advance will go to the failure schedule after one minute with the **L(R) WING ANTI-ICE TEMP LOW** message posted.

1. Thrust Levers............................ Increase (Minimum 62% $N_1$)

**NOTE** If thrust was set below 62% $N_1$, it may take up to three minutes for the system to warm up sufficiently to clear the message.

**NOTE** Posting of the **L(R) WING ANTI-ICE TEMP LOW** message may occur if operating in icing conditions outside the approved envelope. However, if the message does not clear within approximately one minute after exiting icing conditions, a system failure is likely and further icing encounters must be avoided.

┌ **Procedure Continued** ┐

**L(R) WING ANTI-ICE TEMP LOW** (continued)

2. WING FLOW..............................FROM R(L) (opposite side)

***If L(R) WING ANTI-ICE TEMP LOW message remains posted***

3. Icing Conditions ...........................................................Exit
4. WING ANTI-ICE..........................................................OFF
5. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If L(R) WING ANTI-ICE TEMP LOW message clears***

3. Continue flight in icing conditions as required

o ***When clear of icing conditions***

***CAUTION*** *Do not attempt more than one reset of the* **STALL WARN ICE ADVANCE**. *Multiple occurrences of the* **L(R) WING ANTI-ICE TEMP LOW** *message likely indicates a system failure.*

4. Stall Warn Ice Advance Reset ....................................... Select
5. WING ANTI-ICE ........................................................... ON

**NOTE** Operate wing anti-ice until the **STALL WARN ICE ADVANCE** message posts (approximately one minute).

┌ **Procedure Continued** ┐

**L(R) WING ANTI-ICE TEMP LOW** (continued)

6. WING ANTI-ICE....................................................... NORM

--- END OF PROCEDURE ---

o ***If icing conditions expected through approach and landing***

4. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## WING ANTI-ICE UNAVAIL

*Wing anti-ice has been selected ON but is unavailable during single bleed operations.*

**NOTE** When operating in the Single Bleed Inoperative Keep Out Zone, the engine is incapable of supporting wing anti-ice using a single bleed source. If wing anti-ice is manually selected ON, the **WING ANTI-ICE UNAVAIL** message will post alerting the pilot that wing anti-ice is unavailable.

┌ **Procedure Continued** ┐

## WING ANTI-ICE UNAVAIL (continued)

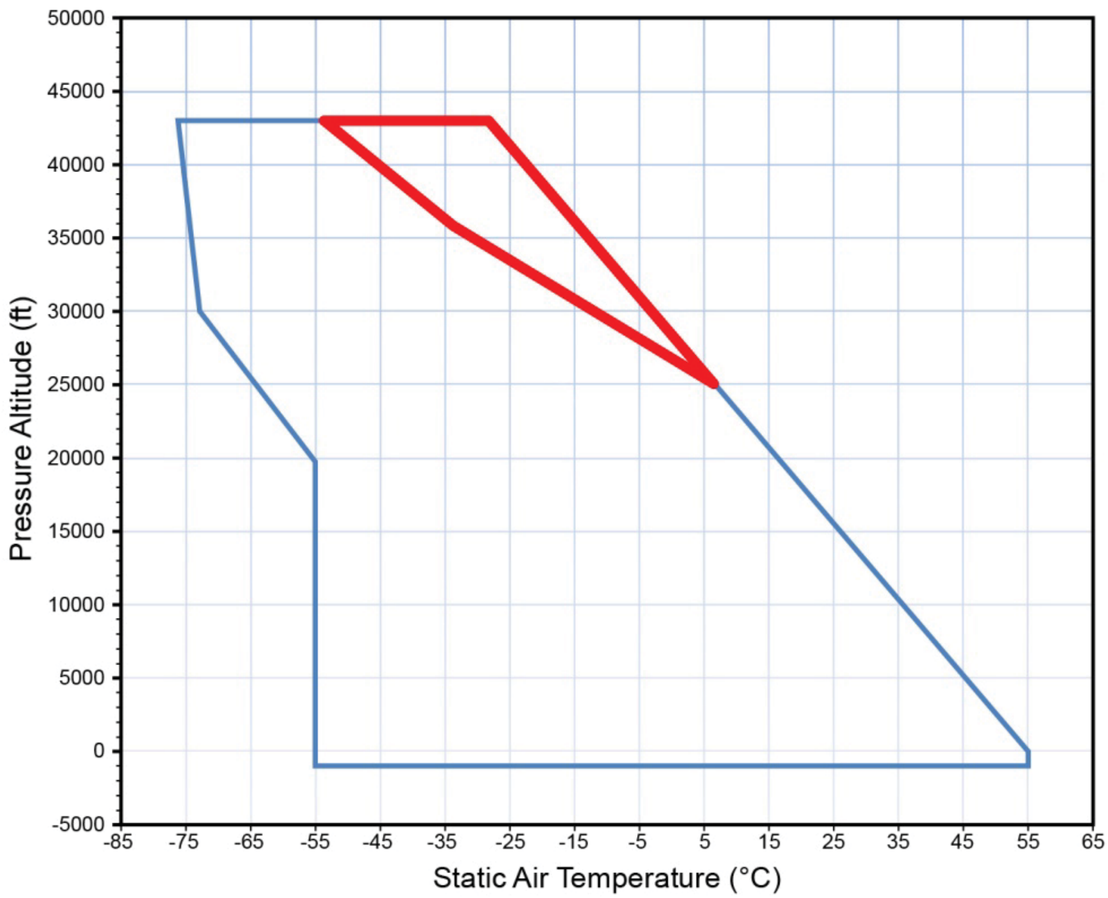


**Figure 13. Single Bleed Inoperative Keep Out Zone**

1. Remain clear of icing conditions
2. WING ANTI-ICE........................................................ NORM

**NOTE** Monitor ITT during operation of wing anti-ice.

**┌ Procedure Continued ┐**

**WING ANTI-ICE UNAVAIL** (continued)

***If icing conditions are encountered***

3. Altitude.......................... Expedite descent to FL 250 or below

***If wing protected surfaces cannot be confirmed to be free of ice***

4. Accomplish LANDING WITH ICE ACCUMULATION ON WINGS (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## L(R) WSHD ZONE FAIL

*There is a failure of the windshield zone heat.*

1. Solid State Relay (SSR) .............................. Reset if necessary

***If WSHD ZONE FAIL message remains***

2. Icing Conditions .................................................................Exit
3. WINDSHIELD HEAT (affected zone) .............................OFF

--- END OF PROCEDURE ---

## L(R) WSHD ZONE OVERHEAT

*There is an overheat of the windshield zone.*

1. Icing Conditions ........................................................... Exit
2. WINDSHIELD HEAT (affected zone) ............................. OFF

--- END OF PROCEDURE ---

# LANDING GEAR AND BRAKES

## ALTERNATE GEAR RELEASE EXTENSION

*Extension of the landing gear using the alternate system is required*

1. LDG GEAR CTRL circuit breaker........................PULL (B7)
2. LANDING GEAR..............................................................DN
3. Airspeed................................................ 150 KIAS minimum
4. ALTERNATE GEAR RELEASE handle................. Pull fully
5. Yaw airplane, if necessary, to obtain gear locked down
6. LANDING GEAR indicator................ Verify three green DN

**NOTE** The gear DOOR icon will remain posted but a normal landing is possible without gear door - ground contact.

7. ALTERNATE GEAR RELEASE handle........................ Stow

***CAUTION*** *The ALTERNATE GEAR RELEASE handle could interfere with thrust lever operation if not stowed following use.*

**NOTE** Normal landing gear operations cannot be restored in flight after activation of the alternate gear release.

**┌ Procedure Continued ┐**

## ALTERNATE GEAR RELEASE EXTENSION (continued)

***If all landing gear indicates down and locked***

8. Land using normal procedures

--- END OF PROCEDURE ---

***If all landing gear doesn't indicate down and locked***

**DESCENT**

1. Select a long, wide, and dry runway with minimal crosswind
2. Landing Field Elevation .......................................... Verify set
3. ENGINE ANTI-ICE..............................................As required
4. Altimeters (transition altitude) ........................................... Set

**APPROACH**

1. Seats and Seat Belts..................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. CABIN SIGNS ....................................................As required
4. Avionics........................................................................... Set
5. Landing Data .............................................. Set and confirmed
6. Radios and Navigation ...................................................... Set

┌ **Procedure Continued** ┐

## ALTERNATE GEAR RELEASE EXTENSION (continued)

7. V-speeds, FMS, and Flight Guidance................................ Set, programmed, and modes selected
8. CAS Messages............................................................Check
9. Approach Briefing..................................................Complete
10. FLAPS ..................................................................TO/APPR

**BEFORE LANDING**

1. SPEEDBRAKE (if installed)...........................................RET
2. FLAPS ..............................................LDG or TO/APPR (ice)

***CAUTION*** *Do not extend the flaps to LDG unless the airframe can be confirmed free of ice and icing conditions are not expected during approach and landing.*

**NOTE** If TAWS-A is installed, the TAWS Warnings will annunciate when landing with Flaps at TO/APPR, unless Flap Override is selected.

3. Airspeed.......................................................................$V_{REF}$
4. Autopilot/Yaw Damper .......................................... Disengage

┌ **Procedure Continued** ┐

## ALTERNATE GEAR RELEASE EXTENSION (continued)

### LANDING

1. Thrust Levers............................................................... IDLE

o ***If the nose wheel is not down and locked***

2. After touchdown.......... Hold nose off ground after landing for as long as possible. Lower prior to loss of elevator control
3. Maintain directional control with rudder and differential braking

**NOTE** When the anti-skid system is active during braking, the amount of available differential braking is reduced.

o ***If one main wheel is not down and locked***

2. After touchdown....... Hold unsupported wing off ground after landing for as long as possible. Lower wing prior to loss of lateral control
3. Maintain directional control with rudder and nosewheel steering
4. EMERGENCY BRAKE ................................ Apply gradually

***CAUTION*** *Use of the emergency brake is required to achieve satisfactory braking as anti-skid would cause brakes to release due to one main gear not being down if normal brakes were used.*

┌ **Procedure Continued** ┐

## ALTERNATE GEAR RELEASE EXTENSION (continued)

**NOTE** Gradually pull emergency brake handle until desired braking action is achieved.

**NOTE** Landing distance will increase by 50%.

5. SPEEDBRAKE (if installed)..........................................EXT

### AFTER AIRCRAFT STOPS

1. PARKING BRAKE............................................................ Set
2. Thrust Levers.........................................................CUT OFF
3. ENGINE FIRE PUSH Switches......................................LIFT COVER and PUSH
4. FIRE EXT PUSH Switch ............................ Push (if required)
5. BATTERY.......................................................................OFF
6. Evacuate the aircraft using the cabin door and/or the emergency exit

--- END OF PROCEDURE ---

## ANTI-SKID FAIL

*The antiskid braking system has failed.*

### PRIOR TO LANDING

1. Select a dry runway

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ | Add 50% |
| TO/APPR (ice) | $V_{REF}$ | Add 50% |

**WARNING** **Any braking above light in wet runway conditions could result in blown tires and loss of directional control.**

**NOTE** Landing distance will increase by 50% on a dry runway and 100% on a wet runway using light braking.

### AFTER TOUCHDOWN

2. Brakes ........................................................ Apply gradually

***CAUTION*** *Brakes must be applied gradually. Light to moderate braking can be applied without skidding tires on a dry surface, however, the pilot should consider runway surface conditions when applying brakes.*

--- END OF PROCEDURE ---

## LDG GEAR FAIL

*The landing gear has not reached the handle commanded position after 20 seconds.*

***If LANDING GEAR handle is UP***

1. Airspeed..................................................200 KIAS maximum

--- END OF PROCEDURE ---

***If LANDING GEAR handle is DN and both main gear are indicating down***

1. Accomplish ALTERNATE GEAR RELEASE EXTENSION (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

***If LANDING GEAR handle is DN and both main gear are not indicating down***

1. LANDING GEAR............................................................... UP
2. Accomplish ALTERNATE GEAR RELEASE EXTENSION (Section 3A – Abnormal Procedures)

--- END OF PROCEDURE ---

## NOSEWHEEL STEER FAIL

*The nosewheel steering system has failed, or is selected OFF during taxi operations.*

**ON GROUND**

1. NOSE WHEEL STEERING ........................................ NORM

***If NOSEWHEEL STEER FAIL message remains***

2. Do not taxi

--- END OF PROCEDURE ---

**IN THE AIR**

1. NOSE WHEEL STEERING .............................................OFF

**PRIOR TO LANDING**

2. Select runway aligned with wind

***CAUTION*** *Nosewheel steering is inoperative. Crosswinds should be minimized to ensure adequate directional control during the low-speed portion of the rollout using differential braking.*

┌ **Procedure Continued** ┐

**NOSEWHEEL STEER FAIL** (continued)

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| LDG | $V_{REF}$ | Add 10% |
| TO/APPR (ice) | $V_{REF}$ | Add 10% |

**NOTE** Nosewheel Steering has failed. Due to use of differential braking, landing distance will increase by 10%.

**AFTER TOUCHDOWN**

3. Maintain directional control with rudder and differential braking

**NOTE** When the anti-skid system is active during braking, the amount of available differential braking is reduced.

**FOLLOWING LANDING ROLLOUT**

4. Taxi to parking using differential braking

--- END OF PROCEDURE ---

## PARK BRAKE FAIL

*Brake pressure is less than 1450 psi with the PARK BRAKE set.*

1. Wheel chocks ........................................................... Install

--- END OF PROCEDURE ---

## PARK BRAKE ON

*The parking brake is pressurized during flight.*

1. EMERGENCY/PARKING BRAKE handle .................. Verify fully released

***If PARKING BRAKE ON message remains posted***

2. Brake pressure ........................................................ Monitor

***If brake pressure is greater than 175 psi***

3. Select long wide runway

**CAUTION** *Main landing gear tires may fail at touchdown.*

***If one or both tires fail***

4. EMERGENGY BRAKE ................................ Apply gradually

--- END OF PROCEDURE ---

# OPERATIONAL

## CABIN SYSTEM SHEDDING

*An anomaly has been detected with a cabin system (including lighting, inverters, or wireless transmitter) requiring the cabin systems to be depowered*

1. CABIN POWER..................................................................OFF

--- END OF PROCEDURE ---

## LANDING WITH ICE ACCUMULATION ON WINGS

*A landing is required with ice buildup on the wing protected surfaces, asymmetric ice buildup or larger than usual buildup aft of the protected surfaces.*

1. Select a long, wide, and dry runway with minimal crosswind

***CAUTION*** *Aircraft response is degraded with ice accumulation on the wings. Crosswinds should be minimized to ensure satisfactory control during approach and landing rollout.*

**DESCENT**

1. Airspeed....................................................200 KIAS or greater
2. Landing Field Elevation .......................................... Verify set
3. ENGINE ANTI-ICE .............................................As required
4. Altimeters (transition altitude) ............................................ Set

**APPROACH**

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing....................................................Complete
3. CABIN SIGNS .......................................................As required
4. Avionics.............................................................................. Set

┌ **Procedure Continued** ┐

## LANDING WITH ICE ACCUMULATION ON WINGS
(continued)

5. Landing Data Set and confirmed
   a. Radios and Navigation .......................................... Set
   b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
   c. Landing Distance..........................................Confirm

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| TO/APPR (ice) | $V_{REF}$ + 35 | Add 75% |

**NOTE** If **STALL WARN ICE ADVANCE** message is posted with Wing Anti-ice OFF or failed, the minimum speeds, as indicated by the low-speed awareness cues, will be increased. Do not fly slower than the approach reference speed (green circle).

**NOTE** The minimum approach speed and landing distance factor are defined in the table. Refer to Uncorrected Landing Field Length, Flaps TO/APPR – Icing (Section 5 – Performance).

┌ **Procedure Continued** ┐

## LANDING WITH ICE ACCUMULATION ON WINGS (continued)

6. CAS Messages.......................................................Check
7. Approach Briefing..................................................Complete
8. Airspeed..................................................$V_{REF}$ +40 minimum
9. TAWS Warnings ...............................................Flap Override

**BEFORE LANDING**

1. FLAPS ..................................................................TO/APPR
2. LANDING GEAR............................................................ DN
3. SPEEDBRAKE (if installed)..........................................RET
4. Airspeed................................................................. $V_{REF}$ +35
5. Autopilot/Yaw Damper .......................................... Disengage

**LANDING**

1. Thrust Levers................................................................IDLE
2. Brakes...............................................Apply (after touchdown)
3. SPEEDBRAKE (if installed)........................................... EXT

┌ **Procedure Continued** ┐

## LANDING WITH ICE ACCUMULATION ON WINGS
(continued)

**BALKED LANDING**

1. TO/GA....................................................................Press
2. Thrust Levers.................................................................TO
3. Airspeed....................................................Maintain $V_{REF}$ +35

**When clear of obstacles**

**CAUTION** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or airframe.*

**NOTE** See performance tables in the Airplane Flight Manual (Section 5 – Performance) and either the Quick Reference Handbook (Volume 1, Performance Section) or the Pilot's Operating Manual (Section 2 – Flight Planning).

4. LANDING GEAR...........................UP (positive rate of climb)
5. Yaw Damper.......................................................... Engaged
6. Thrust Levers...............................................................MCT
7. Flight Guidance .....................................................As required

--- END OF PROCEDURE ---

## REDUCED FLAP LANDING

*A landing with flaps TO/APPR or UP is required.*

### DESCENT

1. Landing Field Elevation .......................................... Verify set
2. ENGINE ANTI-ICE.............................................As required
3. Altimeters (transition altitude) .......................................... Set

### APPROACH

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. CABIN SIGNS .....................................................As required
4. Avionics.......................................................................... Set
5. Landing Data Set and confirmed
    a. Radios and Navigation .......................................... Set
    b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
    c. Landing Distance..........................................Confirm

┌ **Procedure Continued** ┐

## REDUCED FLAP LANDING (continued)

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| UP | $V_{REF}$ + 15 | Add 30% |
| TO/APPR | $V_{REF}$ + 5 | Add 10% |
| UP (ice) | $V_{REF}$ + 10 | Add 30% |

**NOTE** The minimum approach speed and landing distance factor are defined in the table.

**NOTE** For landing in icing conditions, refer to Uncorrected Landing Field Length, Flaps TO/APPR – Icing (Section 5 – Performance).

6. CAS Messages................................................................Check
7. Approach Briefing......................................................Complete
8. TAWS Warnings ..................................................Flap Override

┌ **Procedure Continued** ┐

## REDUCED FLAP LANDING (continued)

### BEFORE LANDING

1. LANDING GEAR.............................................................. DN
2. SPEEDBRAKE (if installed).............................................RET
3. Airspeed.................................................(Flaps UP) - $V_{REF}$ +15
   (Flaps TO/APPR) - $V_{REF}$ +5
   (Flaps UP [ice]) - $V_{REF}$ +10
4. Autopilot/Yaw Damper .......................................... Disengage

### LANDING

1. Thrust Levers...................................................................IDLE
2. Brakes...............................................Apply (after touchdown)
3. SPEEDBRAKE (if installed)............................................ EXT

--- END OF PROCEDURE ---

## SIDE WINDOW LANDING

*A landing is to be conducted using the side windows only due to obstruction of the forward windows.*

1. Select longest, widest runway available.
2. Adjust pilot seat in order to look through the lower forward portion of the side window.
3. Use copilot, if available, to adjust power during approach.
4. Avoid left crosswind if possible for single pilot operations.

***If executing an ILS or LPV APPROACH***

5. At approximately 300 ft AGL, transition to visual reference looking out side window.
6. Land with minimum flare.

--- END OF PROCEDURE ---

***If executing a VISUAL APPROACH***

5. Conduct approach using a left base to short final.
6. Establish airplane on runway centerline at 300 ft AGL and transition to visual reference looking out the side window.
7. Land with minimum flare.

--- END OF PROCEDURE ---

# SINGLE-ENGINE APPROACH AND LANDING

*A landing with one engine shut down is required.*

## DESCENT

1. Landing Field Elevation .......................................... Verify set
2. ENGINE ANTI-ICE.............................................As required
3. Altimeters (transition altitude) .......................................... Set

## APPROACH

1. Seats and Seat Belts.................................Adjusted and secure
2. Passenger Briefing...................................................Complete
3. CABIN SIGNS .....................................................As required
4. Avionics........................................................................ Set
5. Landing Data Set and confirmed
    a. Radios and Navigation .......................................... Set
    b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
    c. Landing Distance..........................................Confirm

┌ **Procedure Continued** ┐

## SINGLE-ENGINE APPROACH AND LANDING (continued)

| Flap Setting | Min Approach Speed | Landing Distance |
|---|---|---|
| TO/APPR | $V_{REF}$ + 5 | Add 10% |
| LDG | $V_{REF}$ | Normal |
| TO/APPR (ice) | $V_{REF}$ | Normal |

6. CAS Messages....................................................Check
7. Approach Briefing..........................................Complete
8. TAWS Warnings ....................................Flap Override
9. FLAPS .........................................................TO/APPR

**BEFORE LANDING**

1. LANDING GEAR ..................................................DN
2. SPEEDBRAKE (if installed)...................................RET
3. FLAPS .........................................................TO/APPR
4. Airspeed................................................... $V_{REF}$ +5
5. AFCS/TRIM MASTER...........................Push and release

**NOTE** Yaw damper status is not annunciated while the rudder bias function is active. Momentary selection of the AFCS/TRIM MASTER will ensure the yaw damper is disengaged for landing.

┌ **Procedure Continued** ┐

## SINGLE-ENGINE APPROACH AND LANDING (continued)

**NOTE** Rudder bias function will be momentarily disabled when the AFCS/TRIM MASTER button is pressed. The pilot should be prepared to apply additional rudder pedal force to compensate.

### LANDING ASSURED

1. FLAPS ............................................... LDG or TO/APPR (ice)
2. Airspeed.................................................................. $V_{REF}$

### LANDING

1. Thrust Lever (operable engine) ....................................... IDLE
2. Brakes ...............................................Apply (after touchdown)
3. SPEEDBRAKE (if installed)........................................... EXT

--- END OF PROCEDURE ---

## SINGLE-ENGINE MISSED APPROACH

*A missed approach with one engine shut down is required.*

1. TO/GA.......................................................................Press
2. Thrust Lever (operable engine) ..........................................TO
3. FLAPS ..................................................................TO/APPR
4. Climb airspeed...............................................................$V_{AC}$
5. LANDING GEAR......................... UP (Positive rate of climb)
6. Yaw Damper..........................................................As required

**When clear of obstacles**

7. FLAPS ...............UP (130 KIAS minimum) or TO/APPR (ice)

***CAUTION*** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or airframe.*

--- END OF PROCEDURE ---

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## SECTION 3B

# ADVISORY PROCEDURES

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| **AVIONICS / AFCS** | | | |
| ADF FAIL | The Automatic Direction Finding system has failed | Use other means of navigation.<br>Note: GNSS may be substituted for ADF per AC 90-108 | MEL |
| ADS B OUT 1(2) FAIL | The ADS-B Out function has failed | Select other transponder (if installed)<br>Consider operational impact | MEL |
| AFCS FAULT | A fault has been detected by the AFCS system | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| | | | |
|---|---|---|---|
| AFCS PITCH SERVO OFF | Pitch Servo is selected OFF | Crew Awareness<br>Exit RVSM airspace<br>Autopilot and Stall Pusher functions are unavailable | No Dispatch |
| AFCS ROLL SERVO OFF | Roll Servo is selected OFF | Crew Awareness<br>Exit RVSM airspace<br>Autopilot function is unavailable | No Dispatch |
| AFCS YAW SERVO OFF | Yaw Servo is selected OFF | Crew Awareness<br>Yaw Damper and Rudder Bias functions are unavailable | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| | | | |
|---|---|---|---|
| AIR DATA 1(2) FAULT | The affected air data probe is operating in a degraded mode.<br>Some minor degradation in air data may be experienced under certain flight conditions. | Monitor Standby Flight Instrument | No Dispatch |
| AUTOPILOT FAIL | The autopilot function has failed | Crew Awareness<br>Exit RVSM airspace | MEL |
| AUTOPILOT FAULT | An automatic pitch trim fault has been detected by the autopilot. If autopilot is disengaged, it may not be able to be reengaged. | Monitor autopilot operations.<br>Notify maintenance following landing | No Dispatch |
| AVIONICS CONFIG | The avionics software/hardware configuration is not correct for the aircraft | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| | | | |
|---|---|---|---|
| AVIONICS FAULT | One or more avionics components are reporting a need for maintenance.<br>One or more displays may be dimmer than usual. | Verify all avionics SD cards are inserted properly.<br>Notify maintenance following landing | MEL |
| COM 1(2) TEMP HIGH | Affected radio reporting a high internal temperature – effective range may be reduced | Consider using other radio for ATC communica-tions | MEL |
| CONFIG BRAKE | Parking brake pressure is greater than 175 psi with the parking brake not set. | Crew Awareness | No Dispatch |
| CONFIG FLAP | Flaps not set to the correct takeoff position | Correct flap position | No Dispatch |
| CONFIG PITCH TRIM | Pitch trim not set in the takeoff band | Correct pitch trim | No Dispatch |

## AVIONICS / AFCS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| CONFIG SPEEDBRAKE | Speedbrake not in the takeoff position | Correct speedbrake position | No Dispatch |
| CONFIG WING ANTI-ICE | Wing anti-ice is active on the ground but wing temperature is less than 10 °C. | Allow wing to warm up before takeoff | No Dispatch |
| CPDLC TEMP HIGH | The CPDLC radio is reporting a high internal temperature – effective range may be reduced. | Consider operational impact | MEL |
| CRUISE SPD CTRL FAIL | Cruise speed control has failed | Control speed manually using the thrust levers | MEL |
| CVR FAIL | The Cockpit Voice Recorder has failed | Consider operational impact | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| DME FAIL | Distance measuring equipment has failed | Use other means of navigation.<br>Note: GNSS may be substituted for DME per AC 90-108 | MEL |
| FDR FAIL | The Flight Data Recorder has failed | Consider operational impact | MEL |
| GLIDE-SLOPE 1(2) FAIL | Affected glide slope has failed | Crew Awareness<br>Use other navigation source | MEL |
| MAINTENANCE MODE | The avionics system is in maintenance mode | Exit Maintenance Mode | No Dispatch |
| L(R) MIC STUCK ON | Associated handmic or PTT switch is stuck on | If associated with handmic, unplug associated | MEL |

## AVIONICS / AFCS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| RUDDER BIAS FAULT | Rudder Bias system has detected a fault but can still activate | Crew Awareness | No Dispatch |
| SATCOM FAIL | Satellite Communication system has failed including Connext™ Weather, or there has been a failure to receive data correctly during an update | Crew Awareness<br>Another update may be attempted. A successful update will clear the message | MEL |
| STALL SHAKER FAIL | The stick shaker is unable to actuate a stall warning command | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| | | | |
|---|---|---|---|
| **STALL WARN ICE ADVANCE** | Stall Shaker and Pusher trigger thresholds and the approach reference speed (green circle) have been compensated due to ice detection or manual operation of wing anti-ice. | Monitor ITT during both automatic and manual operation of wing anti-ice.<br><br>If the aircraft cannot be confirmed to be free of ice accumulation, use Flaps TO/APPR for landing. Reference Uncorrected Landing Field Length, Flaps TO/APPR – Icing (Section 5 – Performance). | Not applicable |
| **STBY AHRS FAIL** | The standby AHRS has failed | Crew Awareness | No Dispatch |
| **STBY AIR DATA FAIL** | Standby instrument air data computer is not providing proper data | Crew Awareness | No Dispatch |
| **SURFACE WATCH FAIL** | SurfaceWatch has failed. | Crew Awareness | MEL |

## AVIONICS / AFCS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| TRANSPONDER 1(2) FAIL | The associated transponder has failed | Select other transponder (if installed)<br>If no transponder is available, the aircraft no longer meets the requirements for flight in RVSM airspace and RVSM airspace must be exited | MEL |
| WEATHER RADAR FAIL | The weather radar has failed | Crew Awareness | MEL |
| WINDSHEAR FAIL | The windshear function has failed | Crew Awareness | MEL |
| XM DATALINK FAIL | SiriusXM® Datalink Weather and Music is failed or data is missing | Crew Awareness | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## AVIONICS / AFCS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| YAW DAMPER FAULT | A fault has been detected in the yaw damper | Monitor yaw damper operations<br>Notify maintenance following landing | No Dispatch |

## DOORS

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| AFT BAG DOOR OPEN | Door open and parking brake set on ground | Crew Awareness | MEL |
| CABIN DOOR OPEN | Door open and parking brake set on ground | Crew Awareness | MEL |
| ELEC SRVC DOOR OPEN | Door open | Crew Awareness | MEL |
| EXT PWR DOOR OPEN | Door open and parking brake set on ground | Crew Awareness | Not Applicable |
| FWD BAG DOOR OPEN | Door open and parking brake set on ground | Crew Awareness | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ELECTRICAL SYSTEMS

| | | | |
|---|---|---|---|
| BATTERY OFF | Battery selected off | Crew Awareness | No Dispatch |
| BATTERY 1(2) FAIL | The associated battery has failed | Crew Awareness | No Dispatch |
| BATTERY 1(2) FAULT | A fault has been detected in the battery or charging system, or the battery temperature is too low for charging. | Crew Awareness | No Dispatch |
| BUS TIE OPEN | BUS TIE switch is selected to OPEN | Crew Awareness | No Dispatch |
| CABIN BUS FAIL | The Cabin bus has failed | One solid state relay reset may be attempted, if applicable | MEL |
| CABIN POWER OFF | The Cabin bus has been manually turned off | Crew Awareness | Not Applicable |
| L(R) GENERATOR FAULT | Minor generator fault detected | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ELECTRICAL SYSTEMS (continued)

| | | | |
|---|---|---|---|
| L(R) GENERATOR OFF | The affected GEN switch is selected OFF | Crew Awareness | No Dispatch |
| POWER OUTLETS MAN ON | Power outlets have been commanded on when auto mode would have commanded them off | Crew Awareness | No Dispatch |

## ENGINES

| | | | |
|---|---|---|---|
| L(R) ENG FAULT | Minor engine fault detected | Crew Awareness | No Dispatch |
| L(R) ENG CHIP DETECTED | Engine oil chip detected | Continue planned flight | No Dispatch |
| L(R) ENG FUEL BYPASS | An impending bypass of the associated fuel filter has been detected | Continue planned flight | No Dispatch |
| L(R) ENG SHUTDOWN | Engine is shutdown | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ENGINES (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| ENG SYNC FAIL | Engine sync has failed | Crew Awareness<br>CSC will not be available | MEL |
| L(R) ENG TLD | Minor failure detected | Crew Awareness | MEL |
| L(R) ENG VIB DETECTOR FAIL | The associated engine vibration detector has failed | Crew Awareness | No Dispatch |
| L(R) FIRE BOTTLE DISCH | Affected fire bottle has been discharged | Crew Awareness | No Dispatch |
| L(R) FIRE BOTTLE LOW | The associated engine fire extinguisher pressure is low and may not be adequate to extinguish a fire | Continue planned flight | No Dispatch |
| L(R) FIRE EXT FAIL | Fire extinguisher has failed | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ENVIRONMENTAL / PRESSURIZATION SYSTEMS

| | | | |
|---|---|---|---|
| CABIN ALT ABOVE 10K | Cabin altitude exceeds 10,000 feet when operating in High Field Mode | Crew Awareness | Inflight Only Message |
| CABIN ALT DUMP | Pressurization selected to DUMP mode | Crew Awareness | MEL |
| CABIN ALT FAULT | Fault in the cabin pressurization system | Crew Awareness | MEL |
| CABIN ALT HOLD | Pressurization selected to HOLD mode | Crew Awareness | No Dispatch |
| L(R) CABIN BLEED FAULT | A fault in the affected cabin bleed system detected | Crew Awareness | MEL |
| L(R) CABIN INFLOW OFF | Associated inflow selected OFF | Crew Awareness<br>Maximum Pressure Altitude 25,000 feet | MEL |
| CABIN OXYGEN ON | Cabin oxygen system is on | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ENVIRONMENTAL / PRESSURIZATION SYSTEMS (continued)

| | | | |
|---|---|---|---|
| ECS AIR COND FAULT | Either the cockpit or cabin evaporator fan has failed | Crew Awareness<br>If cooling is insufficient, ECS Manual Mode may improve cooling | MEL |
| ECS TEMP CONTROL MANUAL | ECS manual mode has been selected | Crew Awareness | Yes |
| L(R) ENG BLEED FAULT | A fault in the affected engine bleed system detected | Crew Awareness | MEL |
| L(R) ENG BLEED OFF | Bleed selected off | Crew Awareness<br>Maximum pressure altitude is 25,000 feet | MEL |
| OXYGEN QTY FAULT | A fault has been detected in the oxygen quantity display | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## FUEL SYSTEMS

| | | | |
|---|---|---|---|
| FUEL CROSSFEED OPEN | Fuel Crossfeed valve is open when commanded closed | Monitor fuel balance and crossfeed as required | No Dispatch |
| FUEL ISO VALVE CLOSED | Isolation valve has failed in the closed position | Crew Awareness<br>Refuel system is inoperative | MEL |
| FUEL ISO VALVE OPEN | Fuel isolation SOV has failed in the open position | Crew Awareness | MEL |
| L(R) FUEL PUMP OFF | Affected FUEL PUMP switch selected OFF | Crew Awareness | No Dispatch |
| L(R) FUEL PUMP ON | Affected fuel pump is commanded on automatically or via the switch | Crew Awareness | No Dispatch |
| L(R) FUEL QTY DEGRADE | A single fuel quantity probe has failed in the affected fuel tank | Monitor affected fuel quantity | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| **FUEL SYSTEMS** (continued) | | | |
| L(R) FUEL SOV FAIL | Fuel shutoff valve has failed to achieve commanded position | Crew Awareness | No Dispatch |
| L(R) FUEL SOV CLOSED | The Fuel SOV Valve is closed | Crew Awareness | No Dispatch |
| **FLIGHT CONTROLS** | | | |
| FLAP DEGRADE | Minor flap fault detected | Crew Awareness | MEL |
| FLAP LEVER DISAGREE | The flap handle does not match the flap position after initial power-up | Select new flap position and then reset to current flap position | No Dispatch |
| PITCH TRIM FAULT | A fault has been detected by the pitch trim system<br><br>One side of pitch trim indication displaying "X" indicates a failure of one trim tab. In this case the trim rate will be degraded | Crew Awareness<br><br>If the trim rate is degraded, avoid rapid speed changes | No Dispatch |

## FLIGHT CONTROLS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| ROLL TRIM FAIL | Roll trim has failed or a stuck switch has been detected and disabled | In the event of a stuck trim switch, roll trim may be regained by cycling the ROLL TRIM POWER to OFF and then back to NORM | No Dispatch |
| ROLL TRIM FAULT | A fault has been detected by the roll trim system | Crew Awareness | MEL |
| ROLL TRIM OFF | Roll trim is selected OFF | Crew Awareness | No Dispatch |
| SPEEDBRAKE FAIL | Speedbrake has failed | Crew Awareness | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## FLIGHT CONTROLS (continued)

| | | | |
|---|---|---|---|
| STBY PITCH TRIM ON | Standby pitch trim has been selected | Crew Awareness<br>Exit RVSM airspace<br>Normal pitch trim is not available<br>Autopilot will not be available | No Dispatch |
| YAW TRIM FAIL | Yaw trim has failed or a stuck switch has been detected | Crew Awareness<br>For a stuck trim switch, functionality might be regained by cycling the YAW TRIM POWER switch to OFF and back to NORM | No Dispatch |
| YAW TRIM FAULT | A fault has been detected by the yaw trim system | Crew Awareness | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## FLIGHT CONTROLS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| YAW TRIM OFF | Yaw trim has been selected OFF | Crew Awareness | No Dispatch |

## HYDRAULIC SYSTEMS

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| EMER BRAKE FAIL | Emergency brake accumulator pressure is less than 1650 psi | Crew Awareness | No Dispatch |
| HYD FLUID LEVEL LOW | The hydraulic reservoir fluid level is below allowable limits | Monitor hydraulic pressure and reservoir fluid level<br>Service hydraulic fluid prior to next flight | MEL |
| HYD FLUID OVERFILL | The hydraulic reservoir fluid level is above allowable limits | Service hydraulic fluid prior to next flight | MEL |
| HYD PUMP FAIL ON | Hydraulic pump has failed on | Monitor hydraulic pressure | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

# ICE PROTECTION SYSTEMS

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| L(R) ENG ANTI- ICE FAULT | A fault has been detected in the affected engine anti-ice system | Crew Awareness | MEL |
| ICE DETECTED | Ice has been detected | Crew Awareness<br>For planes that have NOT accomplished GHAE SB 72-0021:<br>Notify maintenance following landing<br>Maintenance action (LMM task 72-00-00-200-804) required within two flights | Not Applicable |
| ICE DETECT FAULT | One ice detector has failed | Exit icing conditions | MEL |
| TAIL DE-ICE FAIL ON | The tail de-ice system has failed on | Crew Awareness | MEL |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ICE PROTECTION SYSTEMS (continued)

| | | | |
|---|---|---|---|
| TAIL DE-ICE FAULT | There is a degradation in tail de-icing capability | Exit icing conditions | MEL |
| TAIL DE-ICE OFF | The TAIL DE-ICE switch has been selected OFF | Crew Awareness | MEL |
| TAIL DE-ICE ON | The TAIL DE-ICE switch has been selected ON | Crew Awareness | Not Applicable |
| WING ANTI-ICE FAULT | A fault has been detected in the wing anti-ice system | Exit icing conditions | MEL |
| WING ANTI-ICE OFF | WING ANTI-ICE switch selected OFF | Crew Awareness | MEL |
| WING ANTI-ICE ON | WING ANTI-ICE switch selected ON | Monitor ITT during operation of wing anti-ice | Not Applicable |
| WING FLOW FROM L(R) | WING FLOW switch selected FROM L(R) | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## ICE PROTECTION SYSTEMS (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| L(R) WSHD ZONE FAULT | Affected zone unable to select high heat mode | Exit icing conditions | MEL |
| L(R) WSHD ZONE OFF | Applicable windshield zone switch selected OFF | Crew Awareness | MEL |

## LANDING GEAR AND BRAKES

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| LDG GEAR DOOR FAIL | Landing gear door failed to close | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## LANDING GEAR AND BRAKES (continued)

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|
| NOSEWHEEL STEER FAULT | A fault has been detected in the Nosewheel Steering system | NOSE WHEEL STEERING switch should remain in the NORM position during flight and taxi operations to prevent a steering uncommand movement<br><br>Note: When the aircraft is completely stopped, cycling the NOSE WHEEL STEERING switch may clear the message if the fault condition no longer exists | No Dispatch |
| NOSEWHEEL STEER OFF | NOSE WHEEL STEERING switch selected OFF | Crew Awareness | No Dispatch |
| WOW FAULT | WOW system disagree | Crew Awareness | No Dispatch |

| CAS MSG | Description | Crew Action | Dispatch |
|---|---|---|---|

## LIGHTS

| | | | |
|---|---|---|---|
| EXT LIGHTS MAN OFF | Some external lights have manually been selected OFF when automatic logic had determined they should be on | Crew Awareness | Yes |
| LIGHTING CONTROL 1(2) FAIL | The associated lighting controller has failed | Some lighting control may be unavailable<br><br>Associated lights fail to a default configuration | MEL |

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## SECTION 4

# NORMAL PROCEDURES

## TABLE OF CONTENTS

# NORMAL PROCEDURES

## GENERAL

The operating procedures contained in this section are recommended by Honda Aircraft Company for use in operating the airplane. These procedures are provided for guidance and should not be construed as prohibiting the owner/operator from developing equivalent procedures.

## PREFLIGHT INSPECTION

### PRELIMINARY EXTERIOR INSPECTION

1. Wheel Chocks.......................................................As required
2. Engine Covers .........................................................Removed
3. Static Wick Covers ...................................................Removed
4. Pitot Covers .............................................................Removed
5. External Rudder Lock ..............................................Removed
6. Aircraft Tie-Downs ..................................................Removed
7. External Power Unit ................................ Connect, as required

## COCKPIT/CABIN INSPECTION

1. Emergency Exit ........................................................ Secure
2. Emergency Exit Handle Locking Mechanism........... Removed
3. Emergency Equipment ............................................. Checked

**NOTE** Emergency equipment should be checked to ensure it is properly located, not damaged, and is serviceable.

4. Gust Lock ............................................................. Removed
5. Circuit Breakers........................................................... Check
6. LANDING GEAR Handle ................................................ DN
7. BATTERY..................................................................... ON

**NOTE** The avionics are not fully initialized until approximately 60 seconds after selecting the Battery to ON. Indications may be invalid or erroneous during that time.

8. Databases.......................................................... Verify current

***CAUTION*** *Do not use outdated database information. Pilots using any outdated database do so entirely at their own risk.*

9. Fuel Quantity ............................................................... Check
10. PARKING BRAKE.......................................................... Set

## COCKPIT/CABIN INSPECTION (continued)

11. Engine Oil Quantity....................................................Check

**NOTE** If the oil quantity indicates LOW, the aircraft may dispatch if the oil quantity is visually checked to be above the ADD line on the affected engine's sight glass. If the oil quantity is low, add oil prior to engine operation. The minimum acceptable oil quantity as indicated by the ADD line is 5319 cc (5.62 quarts), and the maximum quantity as indicated by the FULL line is 5775 cc (6.10 quarts).

12. Hydraulic Reservoir Quantity........................................Check

**NOTE** Nominal hydraulic reservoir quantity is between 75 and 100%.

13. Oxygen Quantity .........................Adequate for intended flight
14. Trims ................................................................. Set for takeoff
15. FLAPS........................................................................ UP
16. BATTERY...........................................................As required

# EXTERIOR INSPECTION

**NOTE** Prior to conducting flight operation in RVSM airspace, special emphasis should be placed on the condition of Air Data Probes. If any visible damage, deformation, obstruction or static port irregularities are noted, the airplane is no longer RVSM compliant until the discrepancy is corrected.

1. Cabin Door (Checked)
   a. Door Seal........................................Check condition
   b. Upper fuselage antennas....................Check condition
2. Left Nose (Checked)
   a. Windshield and Side Window...........Check condition
   b. Left Air Data Probe ...........................Check condition
   c. Ice Detector .......................................Check condition
   d. Luggage ...........................................Secured properly
   e. Baggage Door.................................Secure and locked
   f. Oxygen Blowout Disk ....................................... Green
   g. Nosegear Doors .................................Check condition
   h. Nosewheel, Tire, and Strut ................Check condition
   i. Nosewheel Steering Pin................................. Installed

## EXTERIOR INSPECTION (continued)

3. Right Nose (Checked)
   a. Standby Air Data Probe ..................... Check condition
   b. Right Air Data Probe ......................... Check condition
   c. Ice Detector ...................................... Check condition
   d. Windshield and Side Window ........... Check condition
   e. Lower Fuselage Antennas ................. Check condition
4. Right Wing (Checked)
   a. Landing Light .................................... Check condition
   b. External Power Door .................. Check condition and Close if GPU not used
   c. Ice Light ..................... Check condition and operation
   d. Electrical Service Door ... Check condition and secure
   e. Air Inlet (belly panel) ............................... Check clear
   f. Center Tank Fuel Drains ..............Drain and check (3)

**NOTE** Fuel drain sumping is only required prior to the first flight of the day.

   g. Lower Fuselage ................................. Check condition
   h. Emergency Exit ..................................... Check secure
   i. Engine Inlet ...................................... Check condition
   j. $T_1$ Probe ........................................... Check condition

## EXTERIOR INSPECTION (continued)

k. Engine Duct and Fan ......... Check condition and clear

l. Stall Strip.......................................... Check condition

m. Anti-ice Exhaust Holes............................ Check clear

n. Wing Tank Fwd Fuel Drain............... Drain and check

**NOTE** Fuel drain sumping is only required prior to the first flight of the day.

o. Gear Doors ........................................ Check condition

p. Wheel, Tire, and Strut ....................... Check condition

q. Upper Surface and Leading Edge...... Check condition

r. Vortilon ........................................................ Checked

s. Wing Bump .................................................. Checked

t. Wingtip Fence ............................................ Checked

u. Lower Surface .................................. Check condition

v. Vortex Generators ....................... Check installed (14)

w. Wingtip Light Assembly ................... Check condition

**NOTE** Pay special attention to surface erosion or frosting of the lens as this may adversely affect the light pattern and brightness.

## EXTERIOR INSPECTION (continued)

x. Winglet ............................................ Check condition

y. Wingtip Triangles ........................ Check installed (18)

z. Anti-ice Exhaust Vent .............................. Check clear

aa. Static Wicks .................................. Check installed (3)

bb. Aileron, Trim Tab, and Flap ............. Check condition

cc. Wing Tank Aft Fuel Drain ................ Drain and check

**NOTE** Fuel drain sumping is only required prior to the first flight of the day.

5. Right Nacelle (Checked)

a. Anti-Ice Exhaust Vent .............................. Check clear

b. Oil Servicing Cap and Door .........Installed and secure

c. Engine Drains .......................................... Check clear

d. Engine Exhaust ........................................ Check clear

e. Inboard Nacelle Access Door ........................... Closed

f. Generator exhaust .................................... Check clear

g. Fan Air Outlet .......................................... Check clear

h. Pylon NACA Scoop ................................ Check clear

## EXTERIOR INSPECTION (continued)

6. Right Aft Fuselage (Checked)
   a. Wheel, Tire, and Strut ........................ Check condition

**NOTE** The amount of exposed chrome on the landing gear strut should not be more than 1.5 inches difference between the left and right strut when the aircraft is on level ground with a balanced fuel load. An exposed chrome difference of more than 1.5 inches in this case may indicate an improperly serviced strut.

   b. Brake ................................................ Check wear pins
   c. Beacon ............................................... Check condition
   d. Fuel Vent ................................................ Check clear
   e. Hydraulic Panel ..................................... Check closed
   f. Lav Service Door.................................... Check closed
   g. ECS Heat Exchanger Exhaust .................. Check clear
   h. Ram Air Intake ........................................ Check clear
   i. Fuel Cap ...................................... Installed and secure

## EXTERIOR INSPECTION (continued)

7. Empennage (Checked)
   a. Vertical Tail Surface .......................... Check condition
   b. VOR Antenna .................................... Check condition
   c. Rudder, Trim Tab, and T-Strips ........ Check condition
   d. Rudder Static Wicks ...................... Check installed (3)
   e. Position Light ................................................ Checked
   f. Speedbrake Panels (if installed) ........ Check condition
   g. Horizontal Tail Surface ..................... Check condition
   h. Logo Lights .................................................. Checked
   i. Elevator, Cuffs, Trim Tabs, and T-Strips ...................................... Check condition
   j. Elevator Static Wicks .................... Check installed (4)
   k. Vortex Generators ....................... Check installed (42)
8. Left Aft Fuselage (Checked)
   a. Environmental Air Intake .......................... Check clear
   b. Aft Fuselage Antennas ...................... Check condition
   c. Ram Air Intake ....................................... Check clear
   d. Aft Baggage Compartment ................. Properly loaded and secure

## **EXTERIOR INSPECTION** (continued)

e. Aft Baggage Door ..........................Closed and locked

f. Fuel Vent ................................................. Check clear

g. Wheel, Tire, and Strut .......................Check condition

**NOTE** The amount of exposed chrome on the landing gear strut should not be more than 1.5 inches difference between the left and right strut when the aircraft is on level ground with a balanced fuel load. An exposed chrome difference of more than 1.5 inches in this case may indicate an improperly serviced strut.

h. Brake ................................................Check wear pins

9. Left Nacelle (Checked)

a. Fan Air Outlet.......................................... Check clear

b. Pylon NACA Scoop ................................ Check clear

c. Generator Exhaust .................................... Check clear

d. Inboard Nacelle Access Door........................... Closed

e. Engine Exhaust........................................ Check clear

f. Engine Drains.......................................... Check clear

g. Oil Servicing Cap and Door .........Installed and secure

h. Anti-Ice Exhaust Vent .............................. Check clear

## EXTERIOR INSPECTION (continued)

10. Left Wing (Checked)

    a. Wing Tank Aft Fuel Drain ................ Drain and check

**NOTE** Fuel drain sumping is only required prior to the first flight of the day.

    b. Aileron, Trim Tab, and Flaps ............ Check condition
    c. Static Wicks.................................. Check installed (3)
    d. Anti-ice Exhaust vent ............................... Check clear
    e. Winglet ............................................ Check condition
    f. Wingtip Triangles........................ Check installed (18)
    g. Wingtip Light Assembly ................... Check condition

**NOTE** Pay special attention to surface erosion or frosting of the lens as this may adversely affect the light pattern and brightness.

    h. Vortex Generators ....................... Check installed (14)
    i. Lower Surface .................................. Check condition
    j. Wingtip Fence ............................................. Checked
    k. Wing Bump ................................................. Checked
    l. Vortilon ........................................................ Checked

## EXTERIOR INSPECTION (continued)

m. Upper Surface and Leading Edge...... Check condition

n. Engine Inlet ....................................... Check condition

o. $T_1$ Probe........................................... Check condition

p. Engine Duct and Fan ......................... Check condition

q. Stall Strip.......................................... Check condition

r. Anti-ice Exhaust Holes...................... Check condition

s. Wing Tank Fwd Fuel Drain............... Drain and check

**NOTE** Fuel drain sumping is only required prior to the first flight of the day.

t. Gear Doors ........................................ Check condition

u. Wheel, Tire, and Strut ....................... Check condition

v. Ice Light ..................... Check condition and operation

w. Electrical Service Door........................... Check closed

x. Landing Light.................................... Check condition

# BEFORE STARTING ENGINES

1. BATTERY....................................................................ON
2. OXYGEN (Checked, ON and NORM)
    a. OXYGEN SUPPLY ......................................Push ON
    b. Oxygen Masks..............................................Set 100%
    c. OXY MASK AUDIO....................................... EMER
    d. Oxygen box TEST/RESET ..............Depress and hold verify blinker turns yellow momentarily, then turns black
    e. Oxygen Mask PRESS TO TEST........ Simultaneously Depress for approximately 3 sec., verify blinker turns yellow momentarily, confirm speaker operation by listening for oxygen flow over speaker
    f. Oxygen box TEST/RESET .............................Release
    g. OXY MASK AUDIO...................................... NORM
    h. CABIN OXYGEN.......................................... NORM
3. PRESSURIZATION (NORM)
    a. CONTROL MODE .......................................... NORM
    b. CABIN DUMP................................................ NORM

## BEFORE STARTING ENGINES (continued)

4. ELECTRICAL (ON and NORM)
    a. BATTERY.................................................Verify ON
    b. GENERATOR.........................................Both NORM
    c. BUS TIE ............................................... Normal (dark)
    d. CABIN POWER.................................. Normal (dark)
5. ELT......................................................................... NORM
6. NOSE WHEEL STEERING ....................................... NORM
7. LANDING GEAR ............................................................ DN
8. ALTERNATE GEAR RELEASE Handle..... Stowed (fully in)
9. PARKING BRAKE........................................................... Set
10. FLAPS ......................................................................... UP
11. Thrust Levers..........................................................CUT OFF
12. SPEEDBRAKE (if installed)............................................RET
13. ICE PROTECTION (NORM and OFF)
    a. WING ANTI-ICE............................................ NORM
    b. WING FLOW.................................................. NORM
    c. ENGINE ANTI-ICE................................... Both OFF
    d. TAIL DE-ICE.................................................. NORM
14. FUEL PANEL (NORM)
    a. PUMPs...................................................Both NORM
    b. CROSSFEED .................................................. NORM

# BEFORE STARTING ENGINES (continued)

15. TRIM PANEL (Checked, set and NORM)
    a. PITCH MODE STBY (check operation), then NORM
    b. ROLL TRIM POWER..................................... NORM
    c. YAW TRIM POWER ..................................... NORM
    d. Trims ............................... Checked and set for takeoff
16. WINDSHIELD HEAT Panel ....................................... NORM
17. PNEUMATIC Panel (NORM)
    a. CABIN INFLOW ....................................Both NORM
    b. ENGINE BLEED ....................................Both NORM
18. Glareshield Panels (Dark)
    a. Pilot's DISPLAY REVERSION .......... Normal (dark)
    b. Pilot's CHIME...................................... Normal (dark)
    c. AFCS PITCH SERVO POWER .......... Normal (dark)
    d. AFCS ROLL SERVO POWER ........... Normal (dark)
    e. AFCS YAW SERVO POWER ............ Normal (dark)
    f. Copilot's DISPLAY REVERSION...... Normal (dark)
    g. Copilot's CHIME ................................ Normal (dark)
19. Standby Instrument.................................................... Checked

## BEFORE STARTING ENGINES (continued)

20. AVIONICS INITIALIZATION (Complete)
    a. SYSTEM TESTS ........................................Complete
        i. Fire Detection and Suppression..............Press
            - Verify both FIRE lights illuminate accompanied by FIRE aural alert
        ii. Stall Warning and Protection .................Press
            - Verify shaker activates twice
        iii. Switchlights...........................................Press
            - On GPU power, verify all switchlights are illuminated
            - On battery power, verify all switchlights illuminate, except AFCS Servo Power Panel and PUSH TO DISC switchlights.
        iv. CVFDR..................................................Press
            - Verify tone can be heard in headset for 5 seconds

**NOTE** When operating on battery power, the CVFDR is unpowered and the system test will fail. If necessary, the system can be retested once engine generator or GPU power is available.

## BEFORE STARTING ENGINES (continued)

b. WEIGHT AND FUEL....................................Entered

c. FLIGHT PLAN .............................................Entered

d. V-speeds........................................................Entered

e. ADS-B information ........................................Entered

## STARTING ENGINES

1. Passenger Briefing.....................................................Complete
2. Rudder Pedals...........................................................Adjusted
3. Seats, Safety Belts .............................................................. Set
4. Doors ......................................................................... Closed

**NOTE** The pilot should verify the doors are closed by review of the CAS messages or synoptic page, and by verifying the main entry door indicators are green.

5. PARKING BRAKE........................................................... Set
6. CAS Messages.............................................................Review
7. ELEC VOLTS ........................................ 23.5 Volts minimum

**NOTE** If the batteries have been cold-soaked as defined in Cold Weather Operations (Section 4 – Normal Procedures), engine start is permitted to 22.5 volts.

# STARTING ENGINES (continued)

8. Engines (Start)
   a. ENGINE START (selected engine) .................... Press
   b. Thrust Lever ....................................................... IDLE
   c. Engine Indications .................................... MONITOR
      i. ITT .................. Verify rise within 15 seconds
      ii. Verify starter disengages at 45% $N_2$

**NOTE** The FADEC will automatically terminate an abnormal start but it cannot ensure that ITT start limits (556 °C) are not exceeded. The Pilot must monitor ITT during start and ensure ITT remains within limits.

The FADEC will abort starts on the ground for the following conditions:

- No increase in ITT within 15 seconds after fuel is introduced
- No $N_1$ rotation
- $N_2$ not steadily increasing to Idle
- $N_2$ fails to reach 95% of Idle within 76 seconds after light off

## STARTING ENGINES (continued)

9. Engine Instruments .................................................... Check
10. ENGINE ANTI-ICE ............................................ As required
11. External Power ...................................................... Disconnect
12. Flight Controls ............................................... Free and correct

## BEFORE TAXI

1. WING ANTI-ICE ................................................ As required

**NOTE** Monitor ITT during operation of wing anti-ice.

2. Avionics / Flight Data (Set/Entered)
    a. Transponder Code .......................................... Entered
    b. Flight ID ................................................... Confirmed
    c. Flight Plan ..................................................... Entered
    d. Runway ........................................................ Selected
    e. Navigation source .................................................. Set
3. Altimeters ................................................... Set BARO, verify altitude within 75 feet of the field elevation and agree within 75 feet of each other

## BEFORE TAXI (continued)

4. FLAPS ........................................................ Set for takeoff
5. SPEEDBRAKE (if installed)...................... Checked then RET
6. CABIN SIGNS ..................................................... As required
7. PARKING BRAKE.................................................... Release

## TAXI

1. Brakes ....................................................................... Check
2. Nosewheel Steering ...................................................... Check
3. Flight Instruments......................................................... Check

**NOTE** The recognition and landing lights may be used to supplement the taxi lights as needed in poorly lit and/or wet taxiway conditions.

# BEFORE TAKEOFF

1. FLAPS .............................................................. Set for takeoff
2. Trims ............................................................... Set for takeoff
3. SPEEDBRAKE (if installed)............................................RET
4. CAS Messages.............................................................. Review
5. Navigation ........................................................................ Set
6. Flight Guidance ................................................................ Set
7. TOLD Data...........................................................Confirmed

**NOTE** Crew must confirm that appropriate V-speeds are still posted. V-speeds may become deselected and revert back to default values after performing engine starts on battery power.

**NOTE** The takeoff field length provided in the performance section of the flight manual is based on a dry runway. If departing from a wet runway, it is recommended to increase the predicted takeoff field length by 30%.

8. Takeoff Briefing.......................................................Complete
9. Radar ...................................................................As required

## BEFORE TAKEOFF (continued)

10. ICE PROTECTION (As required)
    a. WING ANTI-ICE......................................As required

**NOTE** Monitor ITT during operation of wing anti-ice.

    b. ENGINE ANTI-ICE..................................As required

## TAKEOFF

1. Thrust Levers....................................................................TO
2. Engine Instruments.............. Verify that $N_1$ pointers match $N_1$ target settings within 1%.
3. Brakes..........................................................................Release
4. Nose-up Pitch Attitude at Rotation................... 13° (Flaps UP)
   12° (Flaps TO/APPR)

# AFTER TAKEOFF

1. LANDING GEAR..........................UP (positive rate of climb)
2. Yaw Damper...................................................Verify engaged
3. FLAPS............................................UP (130 KIAS minimum)
4. Thrust Levers..................................................................MCT
5. Flight Guidance .....................................................As required
6. ICE PROTECTION (As required)
    a. WING ANTI-ICE........................................... NORM
    b. ENGINE ANTI-ICE..................................As required
7. CABIN SIGNS .......................................................As required

# CLIMB

1. Pressurization ............................................................ Checked
2. Altimeters (transition altitude) ....................................Set STD

## PRIOR TO ENTERING RVSM AIRSPACE

3. Flight Guidance .......................................CPL to pilot flying, select desired modes
4. Autopilot.................................................................... Engage

# CRUISE

## WHEN IN RVSM AIRSPACE, ONCE PER HOUR

1. Altimeters / Altitude..........................Set / Agree within 200 ft

## DURING ALL PHASES OF CRUISE FLIGHT

2. Systems..................................................................Monitor

# DESCENT

1. Landing Field Elevation .......................................... Verify set
2. ENGINE ANTI-ICE.............................................As required
3. Altimeters (transition altitude) ........................................... Set

# APPROACH

1. Seats and Seat Belts................................Adjusted and secure
2. Passenger Briefing..................................................Complete
3. CABIN SIGNS ....................................................As required
4. Avionics........................................................................ Set
5. Landing Data Set and confirmed
    a. Radios and Navigation .......................................... Set
    b. V-speeds, FMS, and Flight Guidance.................... Set, programmed, and modes selected
    c. Landing Distance..........................................Confirm

**NOTE** The landing distance provided in the performance section of the flight manual is based on a dry runway. If landing on a wet runway, it is recommended to increase the predicted landing distance by 30%.

6. CAS Messages.............................................................Check
7. Approach Briefing..................................................Complete
8. FLAPS ...................................................................TO/APPR

# BEFORE LANDING

1. LANDING GEAR .......................................................... DN
2. SPEEDBRAKE (if installed)..........................................RET
3. FLAPS ............................................LDG or TO/APPR (ice)

***CAUTION*** *Do not extend the flaps to LDG unless the airframe can be confirmed free of ice, and icing conditions are not expected during approach and landing.*

**NOTE** If TAWS-A is installed, the TAWS Warnings will annunciate when landing with Flaps at TO/APPR, unless Flap Override is selected.

4. Airspeed.......................................................................... $V_{REF}$
5. Autopilot/Yaw Damper ......................................... Disengage

# LANDING

1. Thrust Levers.................................................................IDLE
2. Brakes............................................Apply (after touchdown)

**NOTE** Establish directional control using rudder and then apply brakes symmetrically during the initial part of the landing rollout.

3. SPEEDBRAKE (if installed)........................................... EXT

# BALKED LANDING

1. TO/GA.......................................................................Press
2. Thrust Levers.................................................................TO
3. Airspeed............................................................Maintain $V_{REF}$

## WHEN CLEAR OF OBSTACLES

4. FLAPS.........................................................TO/APPR
5. LANDING GEAR..........................UP (positive rate of climb)
6. Yaw Damper.................................................Engaged
7. Airspeed.............................................................Maintain $V_{AC}$
8. FLAPS...............UP (130 KIAS minimum) or TO/APPR (ice)

***CAUTION*** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or airframe.*

9. Thrust Levers.................................................................MCT
10. Flight Guidance.....................................................As required

# AFTER LANDING

1. CABIN SIGNS .......................................................As required
2. ENGINE ANTI-ICE ..............................................As required
3. SPEEDBRAKE (if installed)............................................RET
4. FLAPS .................................................... UP or TO/APPR (ice)

***CAUTION*** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or airframe. The flaps must be inspected, and any residual ice must be removed before retracting the flaps to UP.*

5. Trims ........................................................... Set in green band

**NOTE** The recognition and landing lights may be used to supplement the taxi lights as needed in poorly lit and/or wet taxiway conditions or when ice has accumulated on the wing taxi light. Reduce taxi speed as required.

# SHUTDOWN

1. PARKING BRAKE............................................................ Set
2. Wheel Chocks..........................................................Installed
3. ENGINE ANTI-ICE........................................................OFF
4. External Power ...................................................... As desired
5. Thrust Levers..........................................................CUT OFF

**NOTE** Operate the engine at idle thrust for a minimum of 2 minutes before shutdown to thermally stabilize the engine hot section. Time of operation at or near idle such as taxiing can be considered idle thrust.

6. CABIN SIGNS ......................................................As required
7. OXYGEN SUPPLY .................................................. Pull off
8. PARKING BRAKE....................................................Release
9. BATTERY.....................................................................OFF

# CROSSWIND PROCEDURES

## GENERAL

These procedures are applicable for crosswind takeoff and landing with or without the optional speedbrake.

***CAUTION*** *Takeoffs and landings on contaminated runways can have significant additional risks due to the varied surface conditions likely to be encountered.*

***CAUTION*** *For takeoffs and landings on wet or icy runways, the maximum crosswind capability may be significantly reduced due to the reduced steering authority contributed by the nosewheel.*

***CAUTION*** *Operations with any tailwind component in conjunction with crosswinds, especially on contaminated runways, should be avoided due to the inherent hazard of operating on such runways.*

***CAUTION*** *Large and prompt aileron and rudder pedal inputs may be required in crosswind conditions close to or exceeding the maximum allowable crosswind or in gusty conditions.*

## CROSSWIND TAKEOFF PROCEDURE

The crosswind technique for takeoff requires that the pilot hold aileron into the wind to maintain wings level. Maintain nosewheel contact with the runway throughout the takeoff roll. Do not over control in aileron since it can result in heading deviations due to induced lift differences between the upwind and downwind wing. Rudder pedals must be used to maintain directional control.

The directional authority available through the rudder pedals is a function of groundspeed, airspeed, runway condition (wet, icy, etc.) and the magnitude of the crosswind.

## CROSSWIND LANDING PROCEDURE

WARNING **The bank angle must be limited to 10 degrees in order to ensure wingtip clearance from the runway surface.**

***CAUTION*** *Not following the procedures provided in this section may result in large centerline deviations.*

## CROSSWIND LANDING PROCEDURE (continued)

The final approach phase of the crosswind landing should be flown wings-level, utilizing a crab angle into the wind sufficient to stabilize the aircraft path along the extended runway center line.

WARNING **For landings with a crosswind greater than 15 knots, the approach must be made using a crab technique. A landing in these conditions using a wing low method could result in a wingtip strike.**

Avoid excessive airspeed during the final approach. Similar to a performance landing, minimum flare should be used. An extended flare will make drift correction more difficult and will increase pilot workload.

Just prior to touchdown, perform the de-crab maneuver by applying rudder to align the aircraft fuselage with the runway. Simultaneously apply aileron into the wind to minimize drift. Attempt to completely align the aircraft with the center line prior to touchdown. If drift cannot be controlled, a go-around should be performed.

Touch down with the upwind landing gear first, then set the other main wheel on the runway without delay followed by a prompt de-rotation.

## **CROSSWIND LANDING PROCEDURE** (continued)

Upwind aileron should be applied immediately after touchdown to ensure the upwind landing gear remains firmly in contact with the surface. Directional control should be maintained by applying rudder to track the center line. Apply slight forward pressure on the yoke to ensure nosewheel contact with the runway. Symmetrical braking and speedbrake (if installed) should be applied as required to decelerate.

**NOTE** Lateral control during the ground roll has been shown to be relatively ineffective in countering wing rocking motions, which may occur after touchdown of one main gear prior to the opposite main gear. Use steady, upwind aileron input to maintain main gear firmly in contact with the ground rather than attempting a counter rocking motion.

**NOTE** Approximately 2 seconds after nosewheel has registered weight-on-wheels, the nosewheel steering becomes active, and the steering will then move to the position being commanded by the rudder pedals. This transition may introduce a yawing response, which should be promptly countered using rudder inputs.

**NOTE** Rudder and nosewheel steering are significantly more effective in maintaining directional control than differential braking. In addition, the amount of available differential braking may be reduced if anti-skid is active.

## CROSSWIND LANDING PROCEDURE (continued)

**NOTE** The contribution to directional stability from the main wheels is reduced with increased braking. If directional control is in question, release the brakes and apply rudder as required to correct. Once directional control has been re-established, apply symmetrical braking.

# COLD WEATHER OPERATIONS

When operating in cold weather conditions, adherence to the procedures listed below in addition to the normal procedures, is recommended.

## COLD SOAK

Cold soak is defined as a continuous period of longer than two hours at an outside air temperature below 0 °C in which the aircraft is not powered. Prior to aircraft cold-soak, perform the following:

### General

- Retract flaps (after confirming free of ice and snow).
- Chock wheels. Release parking brake.
- Install engine, ice detector and air data probe covers.
- Remove beverage containers.
- Drain water system.
- Drain waste system.

### Below -15 °C

- Remove crew oxygen masks and store at room temperature.

**NOTE** Masks may be left in the aircraft if OXYGEN SUPPLY is left in the OFF position until the cockpit temperature is at or above -15 °C.

## COLD SOAK (continued)

**Below -15 °C** (continued)

- Remove hand-held microphones and store at room temperature.

**NOTE** Microphones may be left in the aircraft if not used until the cockpit temperature is at or above -15 ºC.

**Below -20 °C**

- Remove both batteries and store at room temperature.

## PREFLIGHT INSPECTION

During pre-flight inspection following a cold-soak, add or pay special attention to the following items.

**Aircraft Preparation**

- Install batteries (if removed).
- Service water system.
- Service waste system.

**NOTE** If the water or waste system is serviced in below freezing temperatures, the cabin heating system must be operating within 30 minutes to prevent fluids from freezing.

## **PREFLIGHT INSPECTION** (continued)

- Install crew oxygen masks (if removed).
- Install hand-held microphones (if removed).

### Exterior Inspection

- Carefully inspect all surfaces of the airframe to ensure that aircraft critical areas are free of any ice, snow, slush, or frost. See ICING LIMITATIONS (Section 2 - Limitations) for definition of critical areas.
- Remove snow, slush and ice from landing gear struts, brakes, switches, doors and wheel wells.

**NOTE** Carefully inspect forward facing parts of the nose landing gear and door. Contamination of the nose landing gear and door may prevent successful gear retraction.

- Carefully inspect engine inlet, inlet lip, fan, inner fan case abradable liner (wear), spinner, and exhaust duct to ensure all ice and / or snow is removed. Rotate fan to ensure it rotates freely.
- Carefully inspect for any fluid leaks.
- Carefully inspect all intakes and vents for blockage.

## BEFORE STARTING ENGINES

Cockpit displays may take up to one minute to power up. Colors may be faded, touch-screen response may be slower and dynamic items may appear blurred until the displays are fully warmed up.

**NOTE** A "CHECKLIST FILE INVALID" CDU message may post. The checklist will be functional after the message has been acknowledged and all displays are powered.

Confirm seat adjustments have latched since they may not automatically spring back to the latched position before the cabin has been heated up.

If the batteries were cold-soaked, the following procedure must be followed:

Before starting engines, warm up the batteries by operating on battery power (no external power) with BUS TIE OPEN for a minimum of 25 minutes or when bus voltage drops to 22.5 V, whichever comes first.

The **FUEL TEMP LOW** message may post if the aircraft has been cold-soaked close to or below -40 °C. Refueling with warmer fuel or warming the aircraft in a hangar is recommended. Operating the engines for an extended period of time may also increase fuel temperature enough to clear the message.

## STARTING ENGINES

Engine starts will be slower than normal and higher than normal oil pressure can be expected.

If the oil temperature is below the start limitation of -40 °C, the engines should be preheated using warm air prior to start.

**NOTE** Oil pressure indications are dashed when the oil temperature is below -40 °C.

Oil pressure may reach the maximum indication but should subside as oil temperature increases. If oil pressure remains above normal range after oil temperature stabilizes, the engine should be shut down and the cause investigated.

Delay selection of engine anti-ice to ON until 15 seconds after reaching IDLE thrust.

**WARNING** **Do not use external heaters to heat the fuel.**

Operate each trim axis to ensure proper operation, and perform a thorough, full deflection flight control sweep.

**NOTE** Flight control forces will be higher than usual due to increased friction.

## BEFORE TAXI

Do not operate engines at MCT or above until oil temperature is at or above 10 °C.

Cockpit and Cabin temperature must be at or above -15 °C (5 °F) before dispatch. Operating both engines above IDLE thrust (at least 45 psi manifold pressure is recommended) will reduce time required to warm the cabin.

Cabin delta P of up to 0.5 psi may be indicated with the cabin unpressurized before the cabin has been heated.

## TAXI

If taxiways are covered by ice, snow or slush, taxi at lower than usual speeds and allow greater distance for stopping. Avoid taxiing closely behind aircraft with running engines. Use the brakes frequently and taxi with flaps retracted. Monitor wingtips for clearance to snow banks.

## TAKEOFF

Consider the effect of any runway contaminants on the takeoff distance.

Delay landing gear retraction after taking off from a snow or slush covered runway.

# OPERATING IN ICING CONDITIONS

Adherence to the procedures listed below in addition to the normal procedures and limitations are required when operating in conditions susceptible to airframe icing.

## ICING CONDITIONS

The aircraft has been approved to operate within the icing envelope defined by 14 CFR Part 25 Appendix C. Icing conditions that are outside this envelope may be encountered during flight operations. The ice detecting system detects those conditions requiring automatic activation of the ice protection systems. Some conditions that may result in a very light ice accretion on the airframe do not require ice protection and, therefore, will not be annunciated. Other conditions, such as freezing rain or freezing drizzle, may exceed the capabilities of the ice protection systems and can have a severe impact on aircraft handling characteristics and performance.

**WARNING** **The autopilot and CSC may not maintain airspeed if ice accretes on the airplane. Monitor airspeed closely.**

## ICING CONDITIONS (continued)

**WARNING** **If unusually extensive ice accretes on the wing or engine nacelle aft of the protected areas, or if unusual lateral trim requirements or autopilot trim warnings are encountered, or if ice accretes on the wing or engine protected areas, accomplish the following:**

- **If the flaps are extended, do not retract them until the airframe is verified clear of ice.**
- **Reduce the angle-of-attack by increasing speed as much as the airplane configuration and weather allow, without exceeding design maneuvering speed.**
- **If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot. Do not re-engage the autopilot until the airframe is verified clear of ice.**
- **Exit the icing area immediately by changing altitude or course; and**
- **Report these weather conditions to air traffic control.**

***CAUTION*** *Flight in freezing rain or freezing drizzle, may exceed the capability of the ice protection system and result in hazardous ice build-up on protected surfaces, or may result in unusually extensive ice formation aft of the protected area. This ice may not be shed using the ice protection systems, and it may seriously degrade the performance and controllability of the airplane.*

## ICING CONDITIONS (continued)

**NOTE** The prohibition on flight in freezing rain or freezing drizzle is not intended to prohibit purely inadvertent encounters with the specified meteorological conditions; however, pilots should make all reasonable efforts to avoid such encounters and must immediately exit the conditions if they are encountered.

Ice may form in freezing rain or freezing drizzle at temperatures as cold as -18 °C (0 °F), increased vigilance is warranted at temperatures around freezing with visible moisture present. In addition to the cues for determining icing conditions beyond the approved envelope described in ICING LIMITATIONS (Section 2 – Limitations) the following may be used to identify possible freezing rain or freezing drizzle:

- Visible rain when SAT is 5 °C or less.
- Droplets that splash or splatter on impact when SAT is 5 °C or less.

If freezing rain or freezing drizzle conditions are encountered, exit icing (by changing altitude and/or course) conditions immediately. Asking for priority to leave the area is fully justified under these conditions. The following actions are also recommended:

- Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
- Do not engage the autopilot, as it may mask unusual control system forces. If the autopilot is already engaged, hold the control wheel firmly and disengage.
- If an unusual roll response or uncommanded control movement is observed, reduce the angle-of-attack by increasing airspeed or rolling wings level, and apply additional power, if needed.

## ICING CONDITIONS (continued)

- Avoid extending flaps. If the flaps are extended, do not retract them until the airframe is clear of ice.
- If erratic air data indications are observed, fly using known aircraft attitude and thrust settings, crosscheck GPS speed and altitude indications, etc., to maintain basic aircraft control.
- Report the weather conditions to ATC.

## ICE DETECTION

While ice detectors are the primary means to identify icing conditions in-flight they are not capable of reliably detecting icing conditions during ramp and taxi operations. A combination of outside air temperature and atmospheric conditions have to be used, as described in ICING LIMITATIONS (Section 2 – Limitations), to determine whether ground icing conditions exist.

## PREFLIGHT PLANNING

If icing conditions are expected along the planned route certain pre-flight planning considerations must be applied.

**NOTE** When wing anti-ice is activated (automatically or manually), there will be a reduction in aircraft performance. See performance tables in the Airplane Flight Manual (Section 5 – Performance) and either the Quick Reference Handbook (Volume 1, Performance Section) or the Pilot's Operating Manual (Section 2 – Flight Planning).

## PREFLIGHT PLANNING (continued)

### Takeoff

Operating the engine and wing anti-ice systems has a negative impact on aircraft acceleration and climb capability. Performance tables for Wing Anti-ice ON must be used if taking off in ground icing conditions and should be considered if the planned takeoff profile penetrates known or forecast icing conditions. Refer to TAKEOFF – ANTI-ICE FLUID PERFORMANCE ADDITIVES (Section 5 – Performance) if Type II or IV fluids are used.

### Enroute

Operating the engine and wing anti-ice systems has a detrimental effect on climb performance, altitude capability and cruise performance. The impact on fuel burn when operating with engine and wing anti-ice protection systems active must be considered.

### Approach and Landing

If icing conditions are expected along the route of flight, landing performance planning must be based on using TO/APPR flaps and increased icing speeds. Reduced crosswind capability must also be considered. Additionally, operating the engine and wing anti-ice systems has a negative impact on go-around and climb capability in the event of a missed approach or balked landing.

## PREFLIGHT PLANNING (continued)

### Alternate

If icing conditions are expected at the destination airport it may not be possible to safely retract flaps to UP in case of a missed approach. The reduced approach climb capability must be considered, as well as the increased fuel burn to the alternate destination in this configuration.

**NOTE** See performance tables in the Airplane Flight Manual (Section 5 – Performance) and either the Quick Reference Handbook (Volume 1, Performance Section) or the Pilot's Operating Manual (Section 2 – Flight Planning).

## EXTERIOR INSPECTION

The wing ice inspection lights must be operable prior to flight into known or forecast icing at night.

## BEFORE TAXI

If wing anti-ice is required for takeoff, select it on after completion of the automatic pre-flight test to ensure adequate warm-up prior to takeoff. Up to 5 minutes of operation at idle power may be required.

**NOTE** Monitor ITT during operation of wing anti-ice.

If operating in ground icing conditions, a visual and tactile check of the wing leading edge and upper surfaces must be performed as defined in ICING LIMITATIONS (Section 2 – Limitations).

## BEFORE TAXI (continued)

### Ground De-icing

**NOTE** For instructions on how to de-ice the aircraft, see the Pilot's Operating Manual (Section 4 - Service, Handling, and Maintenance).

Following application of the de-icing fluid, perform a slow, full deflection flight control sweep to prevent pooling of fluid in flight control cavities.

If the aircraft has been de-iced, a de-icing inspection must be performed immediately following or during the ground de-icing/anti-icing process. All items below must be confirmed free of snow, ice, and frost accumulation.

- Wing, including leading edges, upper and lower surfaces and aileron control surfaces
- Flaps
- Vertical and horizontal stabilizers, including leading edges, horns, upper and lower surfaces, rudder, elevator and side panels
- Engine inlet and exhaust and nacelle precooler exhaust
- Windshield
- Antennas
- Fuselage
- Air data probes
- Ice Detectors

## BEFORE TAXI (continued)

- Fuel tank vents
- Inlets and exhausts
- Landing gear, gear doors, and wheels and brake assemblies

A final inspection should be performed prior to takeoff to ensure effectiveness of the de-icing and/or anti-icing procedure. The inspection should be conducted within 5 minutes of takeoff and may be conducted from inside the airplane. If a visual inspection is not sufficient to determine whether ice is adhering, perform a tactile check. Indications of loss of effectiveness of de-icing/anti-icing fluid or contamination on airplane surfaces include the items that follow.

- Progressive surface freezing or snow accumulation
- Random snow accumulation
- Dulling of surface reflectivity (loss of gloss) caused by the gradual deterioration of the de-icing/anti-icing fluid to slush

## TAXI

When operating in ground icing conditions, takeoff must be accomplished within 60 minutes of engine start. If an engine has been operated for more than 60 minutes in these conditions, the following ice shedding procedure must be performed prior to takeoff:

1. Over a span of 15 seconds, increase thrust from IDLE to 60% $N_1$. Then over a span of 15 seconds, decrease thrust from 60% $N_1$ to IDLE.

**NOTE** If airport surface conditions or the proximity of other aircraft do not permit the engine thrust to be increased to 60% $N_1$, then use a thrust level as high as practical.

2. Repeat until exiting ground icing conditions or engine vibrations return to normal levels.
3. Shut down engine and inspect for ice accumulation.
4. Engines may be restarted if confirmed clear of ice accumulation.

## TAKEOFF

**WARNING** **Do not take off with any ice, snow, slush, or frost (including polished) adhering to the aircraft critical areas. See ICING LIMITATIONS (Section 2 - Limitations) for definition of critical areas.**

Wing anti-ice must be ON for takeoff in icing conditions. After takeoff, set the WING ANTI-ICE switch to NORM. Minimize time with flaps extended after takeoff. Accelerate to 180 KIAS as soon as practical.

**NOTE** If the WING ANTI-ICE switch is not set to NORM, this may delay failure detection.

**NOTE** Monitor ITT during operation of wing anti-ice.

## ENROUTE

Minimize the duration of icing encounters as much as practical. Often a small change in altitude may be sufficient to exit icing conditions.

The requirement for maintaining a minimum thrust setting when in icing conditions may reduce the descent capability of the aircraft. Consider the reduction in descent and slow-down capability when planning a descent through potential icing conditions. Minimize time with thrust set below the steady state limit. Speedbrake (if installed) can be used to improve descent and slow-down capability.

**NOTE** Monitor ITT during operation of wing anti-ice.

**NOTE** Wing anti-ice must be manually selected on for flight in icing conditions above FL 340.

**NOTE** The outboard heating zone of each windshield may not remain clear in icing conditions.

The autopilot may mask tactile cues that indicate adverse changes in handling characteristics. When in icing conditions, consider not using the autopilot or disconnect it periodically to check for unusual control force or deflection, and to move the flight controls to check for evidence of ice accreting in control surface gaps or frozen actuators.

**WARNING** **The autopilot and CSC may not maintain airspeed if ice accretes on the airplane. Monitor airspeed closely.**

## APPROACH AND LANDING

Minimum thrust setting when wing anti-ice is operating is 62% $N_1$. Thrust settings as low as 50% $N_1$ are allowed if required for descent or deceleration, but these thrust reductions must be limited to less than 5 minutes.

**NOTE** Thrust must be reset to 62% $N_1$ minimum prior to 5 minutes of operation at lower thrust setting to prevent **L-R WING A/I TEMP LOW** from posting and to prevent the stall warning ice advance from going to the failure schedule.

Use Flaps TO/APPR for landing whenever the aircraft cannot be confirmed clear of ice or if icing conditions may be encountered during approach and landing. Refer to Uncorrected Landing Field Length, Flaps TO/APPR - Icing (Section 5 – Performance).

***CAUTION*** *Do not extend the flaps to LDG unless the airframe can be confirmed free of ice, and icing conditions are not expected during approach and landing.*

**NOTE** If TAWS-A is installed, the TAWS Warnings will annunciate when landing with Flaps at TO/APPR, unless Flap Override is selected.

Minimize time with thrust set below the minimum limit. Delay slow-down below 180 KIAS and flap and landing gear extension as long as possible, to minimize the build-up of ice on flaps and landing gear.

## APPROACH AND LANDING (continued)

The stall warning ice advance must not be reset unless the airframe has been confirmed to be free of contamination. There is no visual indicator to confirm that the airframe is clean. Therefore an outside air temperature greater than 5 °C may be the only indication that the airframe is free of contamination.

## BALKED LANDING

It may not be possible to safely retract flaps to UP in case of a missed approach, if icing conditions were encountered with the flaps extended. Climb performance capability and increased fuel burn during cruise to the alternate destination must be considered in this configuration.

***CAUTION*** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or airframe.*

**NOTE** See performance tables in the Airplane Flight Manual (Section 5 – Performance) and either the Quick Reference Handbook (Volume 1, Performance Section) or the Pilot's Operating Manual (Section 2 – Flight Planning).

## AFTER LANDING

If icing was encountered with the flaps extended or after landing on snow or slush covered runway, do not retract flaps to UP until they can be verified to be free from ice and snow accumulation.

***CAUTION*** *Retracting the flaps to UP following an icing encounter with the flaps extended may result in damage to the flaps or aircraft. The flaps must be inspected, and any residual ice must be removed before retracting the flaps to UP.*

## SHUTDOWN

If operating in ground icing conditions, perform the ice shedding procedure described in the preceding TAXI section prior to engine shutdown.

Following a flight with de-icing fluid applied, perform a slow, full deflection flight control sweep to prevent pooling of fluid in flight control cavities.

## POSTFLIGHT INSPECTION

Carefully inspect engine inlet, inlet lip, fan, inner fan case abradable (wear), spinner, and exhaust duct to ensure all ice or snow is removed. Rotate fan to ensure it spins freely.

Inspect the airframe for signs of damage due to ice shedding.

# OXYGEN DURATION TABLES

The following tables are provided for information and mission planning.

## OXYGEN CONSUMPTION

The 50 cubic ft oxygen cylinder provides the following consumption for a pressurized aircraft. The usable oxygen quantity is 1,243 liters with a fully charged system.

**NOTE** Once the lanyard for a cabin mask has been pulled that mask will continue to flow at the listed rate until oxygen is depleted. To preserve crew oxygen, flow to the cabin can be stopped by selecting the CABIN OXYGEN knob to OFF.

## OXYGEN CONSUMPTION (LITERS/HOUR) – CRUISE FLIGHT

**NOTE** If a passenger is seated in the Copilot seat, use data for Crew Mask for that passenger.

**Table 4-1. Oxygen Consumption – Cruise Flight**

| **Aircraft Altitude** (Feet) | **Each Crew Mask** (Liters per Hour) | | **Each Cabin Mask** (Liters per Hour) |
|---|---|---|---|
| | Normal | 100% | |
| 43,000 | 114 | 114 | 186 |
| 41,000 | 138 | 138 | 186 |
| 40,000 | 150 | 150 | 186 |
| 35,000 | 210 | 210 | 189 |
| 30,000 | 270 | 270 | 192 |
| 25,000 | 300 | 414 | 195 |
| 20,000 | 198 | 474 | 198 |
| 15,000 | 150 | 570 | 204 |
| 10,000 | 150 | 714 | 210 |

## OXYGEN CONSUMPTION (LITERS) – EMERGENCY DESCENT

The following tables provide the amount of oxygen required to execute an emergency descent from 43,000 ft to the listed final altitude. Table 4-2 indicates oxygen consumption when the copilot seat is not occupied, and Table 4-3 indicates consumption when the copilot seat is occupied.

**Table 4-2. Oxygen Consumption – If Copilot Seat Is Not Occupied**

| **Final Altitude** | **Number of Passengers in Cabin** | | | | | |
|---|---|---|---|---|---|---|
| (Feet) | 0 | 1 | 2 | 3 | 4 | 5 |
| 25,000 | 25 | 38 | 50 | 63 | 76 | 88 |
| 20,000 | 36 | 53 | 68 | 87 | 103 | 120 |
| 15,000 | 53 | 75 | 95 | 118 | 139 | 159 |
| 10,000 | 79 | 106 | 130 | 161 | 186 | 212 |

**Table 4-3. Oxygen Consumption – If Copilot Seat Is Occupied**

| **Final Altitude** | **Number of Passengers in Cabin** | | | | | |
|---|---|---|---|---|---|---|
| (Feet) | 0 | 1 | 2 | 3 | 4 | 5 |
| 25,000 | 51 | 63 | 77 | 89 | 102 | 114 |
| 20,000 | 74 | 90 | 110 | 126 | 142 | 158 |
| 15,000 | 110 | 130 | 155 | 175 | 196 | 216 |
| 10,000 | 164 | 188 | 222 | 247 | 272 | 297 |

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SECTION 5

# PERFORMANCE

## TABLE OF CONTENTS

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# INTRODUCTION

## GENERAL

This document presents the performance information for the HondaJet Model HA-420 airplane fitted with two Honda GE HF-120 engines. Information in this section specifies the conditions, configurations, and operating modes in which the appropriate performance criteria were calculated.

All performance data in this section are based on flight test data and the following performance conditions:

1. Minimum guaranteed thrust rating less installation, bleed air, and accessory losses.
2. Full temperature and altitude accountability within the operational limits for which the airplane has been certified.
3. Thrust settings ($N_1$) as indicated by the $N_1$ pointers.
4. All takeoff and landing performance is based on a paved, hard runway surface.
5. ICAO standard atmosphere conditions (ISA), with corrections for non-standard conditions, when applicable.
6. Wind speed is measured at a height of 10 meters (33 feet) above the surface.
7. The performance data have been calculated based on the following
    a. A minimum takeoff safety speed ($V_2$) of $1.13 \times V_{SR1}$
    b. A minimum landing reference speed ($V_{REF}$) of $1.23 \times V_{SR0}$

**NOTE** When necessary, interpolation may be used between table values to determine performance for the current ambient conditions and aircraft weight. If interpolation is not used, the next higher ambient temperature and weight should be used for the determination of aircraft performance.

## Standard Operating Configurations

| Flight Segment | Engines | Thrust | Flaps | Gear | Speed |
|---|---|---|---|---|---|
| 1st Segment Climb | 1 | TO | UP or TO/APPR | DN | $V_{LOF}$ to $V_2$ |
| 2nd Segment Climb | 1 | TO | UP or TO/APPR | UP | $V_2$ |
| Final Segment/ Enroute Climb | 1 | MCT | UP | UP | 140 KIAS |
| Approach Climb | 1 | TO | TO/APPR | UP | $V_{AC}$ |
| Landing Climb/ Landing | 2 | TO | LDG | DN | $V_{REF}$ |
| Landing Climb/ Landing (Icing) | 2 | TO | TO/APPR | DN | $V_{REF}$ |

## Standard Performance Procedures

### Normal All Engine Takeoff

1. Set the thrust levers to the takeoff position.
2. Once the engines have stabilized at takeoff power, release the brakes.
3. At $V_R$, rotate smoothly to a pitch attitude of 12° (Flaps TO/APPR) or 13° (Flaps UP).
4. Adjust the pitch attitude as required to achieve a minimum of $V_2$+10 to 15 KIAS at a height of 35 feet above the runway.
5. Retract the landing gear when a positive rate of climb is achieved.

## Takeoff with One Engine Inoperative (Accelerate Go)

1. Follow the procedures for a Normal All Engine Takeoff.
2. The pilot recognizes an engine failure at or above $V_1$.
3. Continue the acceleration to $V_R$.
4. At $V_R$, rotate smoothly to a pitch attitude of 10° (Flaps TO/APPR) or 11° (Flaps UP).
5. Adjust the pitch attitude as required to achieve a minimum of $V_2$ at a height of 35 feet above the runway.
6. Retract the landing gear when a positive rate of climb is achieved.

**NOTE** A momentary decrease in rate of climb may occur due to the landing gear transitioning to the up position.

## Rejected Takeoff (Accelerate Stop)

1. Follow the procedures for a Normal All Engine Takeoff.
2. The pilot recognizes an engine failure or other malfunction prior to $V_1$.
3. Reduce both thrust levers to IDLE.
4. Simultaneously initiate maximum braking.
5. Continue maximum braking until the airplane comes to a complete stop.

## Landing

1. Prior to 50 feet above the runway, establish the airplane on approach at $V_{REF}$ with the Flaps set as required for landing and gear down using thrust to maintain a 3 degree glideslope.
2. At 50 feet above the runway, rapidly reduce both thrust levers to IDLE.
3. Touchdown firmly with little or no flare.
4. Upon touchdown, promptly derotate to nose touchdown and then apply maximum braking.
5. Deploy speedbrakes (if installed).
6. Continue maximum braking until the airplane comes to a complete stop.

**NOTE** The distances provided in this AFM do not take credit for the decrease in stopping distance when deploying the speedbrakes.

## Variable Factors Affecting Performance

Some performance data presented in this section exceeds the weight temperature/altitude limits of the aircraft. These data are provided for interpolation purposes only.

Details of variables affecting performance are given with tables and charts to which they apply. Conditions which relate to all performance computations are:

1. Cabin pressurization ON;
2. Effect of wind corrections have been applied per the applicable FAA regulations.

## PERFORMANCE DEFINITIONS

| Term | Definition |
|---|---|
| 1st Segment Climb | The OEI takeoff climb with the remaining engine at takeoff thrust and the landing gear extended from $V_{LOF}$ to $V_2$. |
| 2nd Segment Climb | The OEI takeoff climb with the remaining engine at takeoff thrust and the landing gear retracted at $V_2$. |
| Accelerate-Stop Distance | The horizontal distance from brake release to the point at which the airplane comes to a complete stop during a takeoff when the first action to stop (apply brakes) was initiated no later than $V_1$. |
| Actual Landing Distance (ALD) | The distance from a point 50 feet above the runway surface to the point at which the airplane would come to a complete stop. This distance assumes a dry, hard surfaced runway. |
| AEO | All engines operating. |
| Approach Climb | The OEI climb in the approach configuration with the engine at takeoff thrust, the flaps in the approach position and the landing gear retracted at $V_{AC}$. |
| Balked Landing Climb | The AEO climb in the landing configuration with the engines at takeoff thrust, the flaps in the landing position and the landing gear down at $V_{REF}$. |

| Term | Definition |
|---|---|
| Brake Energy | The portion of total airplane energy that is absorbed by the brakes during deceleration. |
| Buffet Boundary | The speed of buffet onset in maneuvering flight with flaps and gear up. |
| CAS | Calibrated airspeed. Indicated airspeed corrected for position and instrument error. KCAS is calibrated airspeed expressed in knots. |
| Demonstrated Crosswind | The 90° crosswind velocity component for which adequate control of the airplane was actually demonstrated during takeoff and landing dry runway certification flight testing. |
| Departure Airport Icing Conditions | Icing conditions at the departure airport are defined as a temperature of 5°C SAT or colder with visible moisture present, whether or not icing has been reported or forecasted. |
| Engine-Out Accelerate-Go Distance | The horizontal distance from brake release to the point at which the airplane is 35 feet above the runway surface during a takeoff when one engine is failed at the critical engine failure speed. Also referred to as OEI takeoff distance. |
| Enroute Climb | The OEI climb with the remaining engine at maximum continuous thrust, the flaps up and the landing gear retracted at 140 KIAS. |

| Term | Definition |
|---|---|
| Factored Landing Distance | The factored dry landing distance is equal to the actual landing distance increased by an operational factor. |
| Final Segment Climb | The OEI climb with the remaining engine at maximum continuous thrust, the flaps up and the landing gear retracted at 140 KIAS. |
| Gradient of Climb | The ratio of the change in height during a portion of the climb to the horizontal distance traveled in the same time interval. |
| Gross Climb Gradient | See gradient of climb. |
| IAS | Indicated airspeed. The airspeed indicator reading as installed in the airplane. The information in this manual is presented in terms of knots indicated airspeed (KIAS) unless otherwise stated and assumes zero instrument error. |
| Ice Protection On | Engine Anti-Ice on and Wing Anti-Ice on |
| ISA | International standard atmosphere. |
| M | Mach number. The ratio of true airspeed to the speed of sound. |
| $M_I$ | Indicated Mach number. The Mach number reading as installed in the airplane. Zero instrument error is assumed. |

| **Term** | **Definition** |
|---|---|
| $M_{MO}$ | Maximum operating Mach number. The Mach number that may not be deliberately exceeded in any flight condition. |
| Net Climb Gradient | The gross gradient of climb reduced by 0.8 % during the takeoff phase. The net climb gradient is used for calculating the takeoff flight path. |
| OAT | Outside air temperature. (OAT = SAT) |
| OEI | One engine inoperative. |
| Position Error Correction | A correction applied to indicated airspeed, Mach number and altitude to eliminate the effect of the location of the pressure sources on the instrument reading. |
| Pressure Altitude | Altitude measured from standard sea level pressure (29.92 in Hg) by a pressure altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this manual, altimeter instrument errors are assumed to be zero. Position errors may be obtained from the correction tables/charts. |
| RTO | Rejected takeoff. RTO distance = accelerate-stop distance. |
| Runway Gradient | The change in runway elevation per 100 feet of runway length. A positive gradient refers to an uphill gradient. |

| Term | Definition |
|---|---|
| SAT | Static air temperature. The ambient free air static temperature obtained from either 1) ground meteorological sources or 2) from the total air temperature obtained from onboard temperature measurement adjusted for compressibility effects. (SAT = OAT) |
| Takeoff Flight Path | The climb profile of the airplane beginning at 35 feet above the runway and continuing to a height of at least 1,500 feet, and the aircraft being configured in its enroute configuration and airspeed. The profile is constructed assuming the failure of one engine at the critical engine failure speed during takeoff. The takeoff flight path information may be used to ensure clearance of obstacles during departure. |
| Takeoff Speed Schedule | The values of $V_1$, $V_R$ and $V_2$ for a particular takeoff considering the aircraft configuration, ambient conditions and the runway. |
| TAT | Total air temperature. The onboard measurement of temperature not corrected for compressibility effects on the temperature probe. TAT will always be greater than SAT in proportion to Mach number. |

| Term | Definition |
|---|---|
| TOFL | Takeoff field length. The takeoff field length for a specific weight, altitude, temperature, wind and runway gradient that is the longer of:<br>115 % of the AEO takeoff distance<br>The OEI RTO distance<br>The OEI takeoff distance. |
| Turnaround Time | The minimum waiting time after landing that will ensure that the brakes have cooled enough to provide sufficient braking capacity to perform an RTO and meet the published takeoff performance. |
| $V_A$ | Maneuvering speed. The maximum speed at which application of full aerodynamic control will not overstress the airplane. |
| $V_1$ | Takeoff decision speed. The maximum speed at which the pilot must initiate the first action to discontinue the takeoff. |
| $V_2$ | Takeoff safety speed (OEI). The actual speed attained at 35 feet above the runway with one engine inoperative as demonstrated during certification flight testing. |
| $V_{35}$ | Takeoff safety speed (AEO). The actual speed attained at 35 feet above the runway with all engines operating. |
| $V_{AC}$ | Approach climb speed. $V_{AC} = V_{REF} + 5$ |

| Term | Definition |
|---|---|
| $V_{EF}$ | Engine failure speed.  The speed at which the critical engine is assumed to fail during takeoff. |
| $V_{FE}$ | Maximum flaps extended speed.  The maximum airspeed allowed for operation with the flap setting. |
| $V_{FTO}$ | Final takeoff speed.  Also called enroute climb speed, this is the OEI climb speed with flaps up and maximum continuous thrust. |
| Visible Moisture | Visible moisture includes, but is not limited to, the following conditions:  fog or clouds with visibility less than one mile, falling snow and rain. |
| $V_{LE}$ | Maximum landing gear extended speed.  The maximum airspeed allowed for aircraft operation with the landing gear extended. |
| $V_{LO}$ | Maximum landing gear operating speed.  The maximum airspeed at which the landing gear can safely be extended or retracted. |
| $V_{LOF}$ | Liftoff speed.  The speed at which the airplane first becomes airborne during the takeoff roll. |
| $V_{MCA}$ | Minimum control speed, air.  The minimum flight speed out of ground effect, in the takeoff configuration, at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust. |

| Term | Definition |
|---|---|
| $V_{MCL}$ | Minimum control speed, landing. The minimum flight speed out of ground effect, in the landing configuration, at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust. |
| $V_{MO}$ | Maximum operating airspeed. The speed that may not be deliberately exceeded in any flight condition. |
| $V_R$ | Rotation speed. The speed at which rotation is initiated during the takeoff roll. |
| $V_{REF}$ | Reference landing speed. The landing approach/climb airspeed. |
| $V_{SR}$ | Reference stall speed. The lowest airspeed at which level flight can be sustained by the airplane's wings. |
| Wind | The wind velocity, in knots, recorded as variables in the tables/charts of this section are to be understood as the headwind or tailwind components of the actual winds at 10 meters (33 feet) above the runway surface (tower winds). |

## REFERENCE INFORMATION

### ISA Conversion

Relationship of Static Air Temperature to ISA

**ISA Conversion**

| Alt [ft] | Static Air Temperature [°C] -55 | -50 | -40 | -30 | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | -40.0 | -35.0 | -25.0 | -15.0 | -5.0 | 5.0 | 15.0 | 25.0 | 35.0 | 45.0 | 55.0 |
| 1000 | -42.0 | -37.0 | -27.0 | -17.0 | -7.0 | 3.0 | 13.0 | 23.0 | 33.0 | 43.0 | 53.0 |
| 2000 | -44.0 | -39.0 | -29.0 | -19.0 | -9.0 | 1.0 | 11.0 | 21.0 | 31.0 | 41.0 | 51.0 |
| 3000 | -45.9 | -40.9 | -30.9 | -20.9 | -10.9 | -0.9 | 9.1 | 19.1 | 29.1 | 39.1 | 49.1 |
| 4000 | -47.9 | -42.9 | -32.9 | -22.9 | -12.9 | -2.9 | 7.1 | 17.1 | 27.1 | 37.1 | 47.1 |
| 5000 | -49.9 | -44.9 | -34.9 | -24.9 | -14.9 | -4.9 | 5.1 | 15.1 | 25.1 | 35.1 | 45.1 |
| 6000 | -51.9 | -46.9 | -36.9 | -26.9 | -16.9 | -6.9 | 3.1 | 13.1 | 23.1 | 33.1 | 43.1 |
| 7000 | -53.9 | -48.9 | -38.9 | -28.9 | -18.9 | -8.9 | 1.1 | 11.1 | 21.1 | 31.1 | 41.1 |
| 8000 | -55.8 | -50.8 | -40.8 | -30.8 | -20.8 | -10.8 | -0.8 | 9.2 | 19.2 | 29.2 | 39.2 |
| 9000 | -57.8 | -52.8 | -42.8 | -32.8 | -22.8 | -12.8 | -2.8 | 7.2 | 17.2 | 27.2 | 37.2 |
| 10000 | -59.8 | -54.8 | -44.8 | -34.8 | -24.8 | -14.8 | -4.8 | 5.2 | 15.2 | 25.2 | 35.2 |
| 11000 | -61.8 | -56.8 | -46.8 | -36.8 | -26.8 | -16.8 | -6.8 | 3.2 | 13.2 | 23.2 | 33.2 |
| 12000 | -63.8 | -58.8 | -48.8 | -38.8 | -28.8 | -18.8 | -8.8 | 1.2 | 11.2 | 21.2 | 31.2 |
| 13000 | -65.8 | -60.8 | -50.8 | -40.8 | -30.8 | -20.8 | -10.8 | -0.8 | 9.2 | 19.2 | 29.2 |
| 14000 | -67.7 | -62.7 | -52.7 | -42.7 | -32.7 | -22.7 | -12.7 | -2.7 | 7.3 | 17.3 | 27.3 |
| 15000 | -69.7 | -64.7 | -54.7 | -44.7 | -34.7 | -24.7 | -14.7 | -4.7 | 5.3 | 15.3 | 25.3 |
| 16000 | -71.7 | -66.7 | -56.7 | -46.7 | -36.7 | -26.7 | -16.7 | -6.7 | 3.3 | 13.3 | 23.3 |
| 17000 | -73.7 | -68.7 | -58.7 | -48.7 | -38.7 | -28.7 | -18.7 | -8.7 | 1.3 | 11.3 | 21.3 |
| 18000 | -75.7 | -70.7 | -60.7 | -50.7 | -40.7 | -30.7 | -20.7 | -10.7 | -0.7 | 9.3 | 19.3 |
| 19000 | -77.6 | -72.6 | -62.6 | -52.6 | -42.6 | -32.6 | -22.6 | -12.6 | -2.6 | 7.4 | 17.4 |
| 20000 | -79.6 | -74.6 | -64.6 | -54.6 | -44.6 | -34.6 | -24.6 | -14.6 | -4.6 | 5.4 | 15.4 |
| 21000 | -81.6 | -76.6 | -66.6 | -56.6 | -46.6 | -36.6 | -26.6 | -16.6 | -6.6 | 3.4 | 13.4 |
| 22000 | -83.6 | -78.6 | -68.6 | -58.6 | -48.6 | -38.6 | -28.6 | -18.6 | -8.6 | 1.4 | 11.4 |
| 23000 | -85.6 | -80.6 | -70.6 | -60.6 | -50.6 | -40.6 | -30.6 | -20.6 | -10.6 | -0.6 | 9.4 |
| 24000 | -87.5 | -82.5 | -72.5 | -62.5 | -52.5 | -42.5 | -32.5 | -22.5 | -12.5 | -2.5 | 7.5 |
| 25000 | -89.5 | -84.5 | -74.5 | -64.5 | -54.5 | -44.5 | -34.5 | -24.5 | -14.5 | -4.5 | 5.5 |
| 26000 | -91.5 | -86.5 | -76.5 | -66.5 | -56.5 | -46.5 | -36.5 | -26.5 | -16.5 | -6.5 | 3.5 |
| 27000 | -93.5 | -88.5 | -78.5 | -68.5 | -58.5 | -48.5 | -38.5 | -28.5 | -18.5 | -8.5 | 1.5 |
| 28000 | -95.5 | -90.5 | -80.5 | -70.5 | -60.5 | -50.5 | -40.5 | -30.5 | -20.5 | -10.5 | -0.5 |
| 29000 | -97.5 | -92.5 | -82.5 | -72.5 | -62.5 | -52.5 | -42.5 | -32.5 | -22.5 | -12.5 | -2.5 |
| 30000 | -99.4 | -94.4 | -84.4 | -74.4 | -64.4 | -54.4 | -44.4 | -34.4 | -24.4 | -14.4 | -4.4 |
| 31000 | -101.4 | -96.4 | -86.4 | -76.4 | -66.4 | -56.4 | -46.4 | -36.4 | -26.4 | -16.4 | -6.4 |
| 32000 | -103.4 | -98.4 | -88.4 | -78.4 | -68.4 | -58.4 | -48.4 | -38.4 | -28.4 | -18.4 | -8.4 |
| 33000 | -105.4 | -100.4 | -90.4 | -80.4 | -70.4 | -60.4 | -50.4 | -40.4 | -30.4 | -20.4 | -10.4 |
| 34000 | -107.4 | -102.4 | -92.4 | -82.4 | -72.4 | -62.4 | -52.4 | -42.4 | -32.4 | -22.4 | -12.4 |
| 35000 | -109.3 | -104.3 | -94.3 | -84.3 | -74.3 | -64.3 | -54.3 | -44.3 | -34.3 | -24.3 | -14.3 |
| 36000 | -111.3 | -106.3 | -96.3 | -86.3 | -76.3 | -66.3 | -56.3 | -46.3 | -36.3 | -26.3 | -16.3 |
| 37000 | -111.5 | -106.5 | -96.5 | -86.5 | -76.5 | -66.5 | -56.5 | -46.5 | -36.5 | -26.5 | -16.5 |
| 43000 | -111.5 | -106.5 | -96.5 | -86.5 | -76.5 | -66.5 | -56.5 | -46.5 | -36.5 | -26.5 | -16.5 |

ISA_CONVERSION

## Temperature Conversion

To convert from Celsius to Fahrenheit, find, in bold face columns, the number representing the Celsius temperature to be converted. The equivalent Fahrenheit temperature is read in the adjacent column headed °F.

To convert from Fahrenheit to Celsius, find, in bold face columns, the number representing the Fahrenheit temperature to be converted. The equivalent Celsius temperature is read in the adjacent column headed °C.

| Fahrenheit-Celsius Temperature Conversion | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | ◄ ► | °F | °C | ◄ ► | °F | °C | ◄ ► | °F | °C | ◄ ► | °F | °C | ◄ ► | °F |
| -73.3 | **-100** | -148.0 | -45.6 | **-50** | -58.0 | -17.8 | **0** | 32.0 | 10.0 | **50** | 122.0 | 37.8 | **100** | 212.0 |
| -72.8 | **-99** | -146.2 | -45.0 | **-49** | -56.2 | -17.2 | **1** | 33.8 | 10.6 | **51** | 123.8 | 38.3 | **101** | 213.8 |
| -72.2 | **-98** | -144.4 | -44.4 | **-48** | -54.4 | -16.7 | **2** | 35.6 | 11.1 | **52** | 125.6 | 38.9 | **102** | 215.6 |
| -71.7 | **-97** | -142.6 | -43.9 | **-47** | -52.6 | -16.1 | **3** | 37.4 | 11.7 | **53** | 127.4 | 39.4 | **103** | 217.4 |
| -71.1 | **-96** | -140.8 | -43.3 | **-46** | -50.8 | -15.6 | **4** | 39.2 | 12.2 | **54** | 129.2 | 40.0 | **104** | 219.2 |
| -70.6 | **-95** | -139.0 | -42.8 | **-45** | -49.0 | -15.0 | **5** | 41.0 | 12.8 | **55** | 131.0 | 40.6 | **105** | 221.0 |
| -70.0 | **-94** | -137.2 | -42.2 | **-44** | -47.2 | -14.4 | **6** | 42.8 | 13.3 | **56** | 132.8 | 41.1 | **106** | 222.8 |
| -69.4 | **-93** | -135.4 | -41.7 | **-43** | -45.4 | -13.9 | **7** | 44.6 | 13.9 | **57** | 134.6 | 41.7 | **107** | 224.6 |
| -68.9 | **-92** | -133.6 | -41.1 | **-42** | -43.6 | -13.3 | **8** | 46.4 | 14.4 | **58** | 136.4 | 42.2 | **108** | 226.4 |
| -68.3 | **-91** | -131.8 | -40.6 | **-41** | -41.8 | -12.8 | **9** | 48.2 | 15.0 | **59** | 138.2 | 42.8 | **109** | 228.2 |
| -67.8 | **-90** | -130.0 | -40.0 | **-40** | -40.0 | -12.2 | **10** | 50.0 | 15.6 | **60** | 140.0 | 43.3 | **110** | 230.0 |
| -67.2 | **-89** | -128.2 | -39.4 | **-39** | -38.2 | -11.7 | **11** | 51.8 | 16.1 | **61** | 141.8 | 43.9 | **111** | 231.8 |
| -66.7 | **-88** | -126.4 | -38.9 | **-38** | -36.4 | -11.1 | **12** | 53.6 | 16.7 | **62** | 143.6 | 44.4 | **112** | 233.6 |
| -66.1 | **-87** | -124.6 | -38.3 | **-37** | -34.6 | -10.6 | **13** | 55.4 | 17.2 | **63** | 145.4 | 45.0 | **113** | 235.4 |
| -65.6 | **-86** | -122.8 | -37.8 | **-36** | -32.8 | -10.0 | **14** | 57.2 | 17.8 | **64** | 147.2 | 45.6 | **114** | 237.2 |
| -65.0 | **-85** | -121.0 | -37.2 | **-35** | -31.0 | -9.4 | **15** | 59.0 | 18.3 | **65** | 149.0 | 46.1 | **115** | 239.0 |
| -64.4 | **-84** | -119.2 | -36.7 | **-34** | -29.2 | -8.9 | **16** | 60.8 | 18.9 | **66** | 150.8 | 46.7 | **116** | 240.8 |
| -63.9 | **-83** | -117.4 | -36.1 | **-33** | -27.4 | -8.3 | **17** | 62.6 | 19.4 | **67** | 152.6 | 47.2 | **117** | 242.6 |
| -63.3 | **-82** | -115.6 | -35.6 | **-32** | -25.6 | -7.8 | **18** | 64.4 | 20.0 | **68** | 154.4 | 47.8 | **118** | 244.4 |
| -62.8 | **-81** | -113.8 | -35.0 | **-31** | -23.8 | -7.2 | **19** | 66.2 | 20.6 | **69** | 156.2 | 48.3 | **119** | 246.2 |
| -62.2 | **-80** | -112.0 | -34.4 | **-30** | -22.0 | -6.7 | **20** | 68.0 | 21.1 | **70** | 158.0 | 48.9 | **120** | 248.0 |
| -61.7 | **-79** | -110.2 | -33.9 | **-29** | -20.2 | -6.1 | **21** | 69.8 | 21.7 | **71** | 159.8 | 49.4 | **121** | 249.8 |
| -61.1 | **-78** | -108.4 | -33.3 | **-28** | -18.4 | -5.6 | **22** | 71.6 | 22.2 | **72** | 161.6 | 50.0 | **122** | 251.6 |
| -60.6 | **-77** | -106.6 | -32.8 | **-27** | -16.6 | -5.0 | **23** | 73.4 | 22.8 | **73** | 163.4 | 50.6 | **123** | 253.4 |
| -60.0 | **-76** | -104.8 | -32.2 | **-26** | -14.8 | -4.4 | **24** | 75.2 | 23.3 | **74** | 165.2 | 51.1 | **124** | 255.2 |
| -59.4 | **-75** | -103.0 | -31.7 | **-25** | -13.0 | -3.9 | **25** | 77.0 | 23.9 | **75** | 167.0 | 51.7 | **125** | 257.0 |
| -58.9 | **-74** | -101.2 | -31.1 | **-24** | -11.2 | -3.3 | **26** | 78.8 | 24.4 | **76** | 168.8 | 52.2 | **126** | 258.8 |
| -58.3 | **-73** | -99.4 | -30.6 | **-23** | -9.4 | -2.8 | **27** | 80.6 | 25.0 | **77** | 170.6 | 52.8 | **127** | 260.6 |
| -57.8 | **-72** | -97.6 | -30.0 | **-22** | -7.6 | -2.2 | **28** | 82.4 | 25.6 | **78** | 172.4 | 53.3 | **128** | 262.4 |
| -57.2 | **-71** | -95.8 | -29.4 | **-21** | -5.8 | -1.7 | **29** | 84.2 | 26.1 | **79** | 174.2 | 53.9 | **129** | 264.2 |
| -56.7 | **-70** | -94.0 | -28.9 | **-20** | -4.0 | -1.1 | **30** | 86.0 | 26.7 | **80** | 176.0 | 54.4 | **130** | 266.0 |
| -56.1 | **-69** | -92.2 | -28.3 | **-19** | -2.2 | -0.6 | **31** | 87.8 | 27.2 | **81** | 177.8 | 55.0 | **131** | 267.8 |
| -55.6 | **-68** | -90.4 | -27.8 | **-18** | -0.4 | 0.0 | **32** | 89.6 | 27.8 | **82** | 179.6 | 55.6 | **132** | 269.6 |
| -55.0 | **-67** | -88.6 | -27.2 | **-17** | 1.4 | 0.6 | **33** | 91.4 | 28.3 | **83** | 181.4 | 56.1 | **133** | 271.4 |
| -54.4 | **-66** | -86.8 | -26.7 | **-16** | 3.2 | 1.1 | **34** | 93.2 | 28.9 | **84** | 183.2 | 56.7 | **134** | 273.2 |
| -53.9 | **-65** | -85.0 | -26.1 | **-15** | 5.0 | 1.7 | **35** | 95.0 | 29.4 | **85** | 185.0 | 57.2 | **135** | 275.0 |
| -53.3 | **-64** | -83.2 | -25.6 | **-14** | 6.8 | 2.2 | **36** | 96.8 | 30.0 | **86** | 186.8 | 57.8 | **136** | 276.8 |
| -52.8 | **-63** | -81.4 | -25.0 | **-13** | 8.6 | 2.8 | **37** | 98.6 | 30.6 | **87** | 188.6 | 58.3 | **137** | 278.6 |
| -52.2 | **-62** | -79.6 | -24.4 | **-12** | 10.4 | 3.3 | **38** | 100.4 | 31.1 | **88** | 190.4 | 58.9 | **138** | 280.4 |
| -51.7 | **-61** | -77.8 | -23.9 | **-11** | 12.2 | 3.9 | **39** | 102.2 | 31.7 | **89** | 192.2 | 59.4 | **139** | 282.2 |
| -51.1 | **-60** | -76.0 | -23.3 | **-10** | 14.0 | 4.4 | **40** | 104.0 | 32.2 | **90** | 194.0 | 60.0 | **140** | 284.0 |
| -50.6 | **-59** | -74.2 | -22.8 | **-9** | 15.8 | 5.0 | **41** | 105.8 | 32.8 | **91** | 195.8 | 60.6 | **141** | 285.8 |
| -50.0 | **-58** | -72.4 | -22.2 | **-8** | 17.6 | 5.6 | **42** | 107.6 | 33.3 | **92** | 197.6 | 61.1 | **142** | 287.6 |
| -49.4 | **-57** | -70.6 | -21.7 | **-7** | 19.4 | 6.1 | **43** | 109.4 | 33.9 | **93** | 199.4 | 61.7 | **143** | 289.4 |
| -48.9 | **-56** | -68.8 | -21.1 | **-6** | 21.2 | 6.7 | **44** | 111.2 | 34.4 | **94** | 201.2 | 62.2 | **144** | 291.2 |
| -48.3 | **-55** | -67.0 | -20.6 | **-5** | 23.0 | 7.2 | **45** | 113.0 | 35.0 | **95** | 203.0 | 62.8 | **145** | 293.0 |
| -47.8 | **-54** | -65.2 | -20.0 | **-4** | 24.8 | 7.8 | **46** | 114.8 | 35.6 | **96** | 204.8 | 63.3 | **146** | 294.8 |
| -47.2 | **-53** | -63.4 | -19.4 | **-3** | 26.6 | 8.3 | **47** | 116.6 | 36.1 | **97** | 206.6 | 63.9 | **147** | 296.6 |
| -46.7 | **-52** | -61.6 | -18.9 | **-2** | 28.4 | 8.9 | **48** | 118.4 | 36.7 | **98** | 208.4 | 64.4 | **148** | 298.4 |
| -46.1 | **-51** | -59.8 | -18.3 | **-1** | 30.2 | 9.4 | **49** | 120.2 | 37.2 | **99** | 210.2 | 65.0 | **149** | 300.2 |

TEMP_CONVERSION

## Weight Conversion

To convert from kilograms to pounds, find, in bold face columns, the number representing the kilogram weight to be converted. The equivalent pound weight is read in the adjacent column headed pounds.

To convert from pounds to kilograms, find, in bold face columns, the number representing the pounds weight to be converted. The equivalent kilogram weight is read in the adjacent column headed kilograms.

| Weight Conversion | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Kg | ◀ ▶ | Lb | Kg | ◀ ▶ | Lb | Kg | ◀ ▶ | Lb |
| 0.5 | 1 | 2.2 | 204.1 | 450 | 992.1 | 2404.0 | 5300 | 11684.5 |
| 0.9 | 2 | 4.4 | 208.7 | 460 | 1014.1 | 2449.4 | 5400 | 11905.0 |
| 1.4 | 3 | 6.6 | 213.2 | 470 | 1036.2 | 2494.8 | 5500 | 12125.4 |
| 1.8 | 4 | 8.8 | 217.7 | 480 | 1058.2 | 2540.1 | 5600 | 12345.9 |
| 2.3 | 5 | 11.0 | 222.3 | 490 | 1080.3 | 2585.5 | 5700 | 12566.3 |
| 2.7 | 6 | 13.2 | 226.8 | 500 | 1102.3 | 2630.8 | 5800 | 12786.8 |
| 3.2 | 7 | 15.4 | 272.2 | 600 | 1322.8 | 2676.2 | 5900 | 13007.3 |
| 3.6 | 8 | 17.6 | 317.5 | 700 | 1543.2 | 2721.6 | 6000 | 13227.7 |
| 4.1 | 9 | 19.8 | 362.9 | 800 | 1763.7 | 2766.9 | 6100 | 13448.2 |
| 4.5 | 10 | 22.0 | 408.2 | 900 | 1984.2 | 2812.3 | 6200 | 13668.7 |
| 9.1 | 20 | 44.1 | 453.6 | 1000 | 2204.6 | 2857.6 | 6300 | 13889.1 |
| 13.6 | 30 | 66.1 | 499.0 | 1100 | 2425.1 | 2903.0 | 6400 | 14109.6 |
| 18.1 | 40 | 88.2 | 544.3 | 1200 | 2645.5 | 2948.4 | 6500 | 14330.0 |
| 22.7 | 50 | 110.2 | 589.7 | 1300 | 2866.0 | 2993.7 | 6600 | 14550.5 |
| 27.2 | 60 | 132.3 | 635.0 | 1400 | 3086.5 | 3039.1 | 6700 | 14771.0 |
| 31.8 | 70 | 154.3 | 680.4 | 1500 | 3306.9 | 3084.4 | 6800 | 14991.4 |
| 36.3 | 80 | 176.4 | 725.7 | 1600 | 3527.4 | 3129.8 | 6900 | 15211.9 |
| 40.8 | 90 | 198.4 | 771.1 | 1700 | 3747.9 | 3175.1 | 7000 | 15432.4 |
| 45.4 | 100 | 220.5 | 816.5 | 1800 | 3968.3 | 3220.5 | 7100 | 15652.8 |
| 49.9 | 110 | 242.5 | 861.8 | 1900 | 4188.8 | 3265.9 | 7200 | 15873.3 |
| 54.4 | 120 | 264.6 | 907.2 | 2000 | 4409.2 | 3311.2 | 7300 | 16093.7 |
| 59.0 | 130 | 286.6 | 952.5 | 2100 | 4629.7 | 3356.6 | 7400 | 16314.2 |
| 63.5 | 140 | 308.6 | 997.9 | 2200 | 4850.2 | 3401.9 | 7500 | 16534.7 |
| 68.0 | 150 | 330.7 | 1043.3 | 2300 | 5070.6 | 3447.3 | 7600 | 16755.1 |
| 72.6 | 160 | 352.7 | 1088.6 | 2400 | 5291.1 | 3492.7 | 7700 | 16975.6 |
| 77.1 | 170 | 374.8 | 1134.0 | 2500 | 5511.6 | 3538.0 | 7800 | 17196.1 |
| 81.6 | 180 | 396.8 | 1179.3 | 2600 | 5732.0 | 3583.4 | 7900 | 17416.5 |
| 86.2 | 190 | 418.9 | 1224.7 | 2700 | 5952.5 | 3628.7 | 8000 | 17637.0 |
| 90.7 | 200 | 440.9 | 1270.1 | 2800 | 6172.9 | 3674.1 | 8100 | 17857.4 |
| 95.3 | 210 | 463.0 | 1315.4 | 2900 | 6393.4 | 3719.5 | 8200 | 18077.9 |
| 99.8 | 220 | 485.0 | 1360.8 | 3000 | 6613.9 | 3764.8 | 8300 | 18298.4 |
| 104.3 | 230 | 507.1 | 1406.1 | 3100 | 6834.3 | 3810.2 | 8400 | 18518.8 |
| 108.9 | 240 | 529.1 | 1451.5 | 3200 | 7054.8 | 3855.5 | 8500 | 18739.3 |
| 113.4 | 250 | 551.2 | 1496.9 | 3300 | 7275.3 | 3900.9 | 8600 | 18959.8 |
| 117.9 | 260 | 573.2 | 1542.2 | 3400 | 7495.7 | 3946.3 | 8700 | 19180.2 |
| 122.5 | 270 | 595.2 | 1587.6 | 3500 | 7716.2 | 3991.6 | 8800 | 19400.7 |
| 127.0 | 280 | 617.3 | 1632.9 | 3600 | 7936.6 | 4037.0 | 8900 | 19621.1 |
| 131.5 | 290 | 639.3 | 1678.3 | 3700 | 8157.1 | 4082.3 | 9000 | 19841.6 |
| 136.1 | 300 | 661.4 | 1723.7 | 3800 | 8377.6 | 4127.7 | 9100 | 20062.1 |
| 140.6 | 310 | 683.4 | 1769.0 | 3900 | 8598.0 | 4173.0 | 9200 | 20282.5 |
| 145.1 | 320 | 705.5 | 1814.4 | 4000 | 8818.5 | 4218.4 | 9300 | 20503.0 |
| 149.7 | 330 | 727.5 | 1859.7 | 4100 | 9039.0 | 4263.8 | 9400 | 20723.5 |
| 154.2 | 340 | 749.6 | 1905.1 | 4200 | 9259.4 | 4309.1 | 9500 | 20943.9 |
| 158.8 | 350 | 771.6 | 1950.4 | 4300 | 9479.9 | 4354.5 | 9600 | 21164.4 |
| 163.3 | 360 | 793.7 | 1995.8 | 4400 | 9700.3 | 4399.8 | 9700 | 21384.8 |
| 167.8 | 370 | 815.7 | 2041.2 | 4500 | 9920.8 | 4445.2 | 9800 | 21605.3 |
| 172.4 | 380 | 837.8 | 2086.5 | 4600 | 10141.3 | 4490.6 | 9900 | 21825.8 |
| 176.9 | 390 | 859.8 | 2131.9 | 4700 | 10361.7 | 4535.9 | 10000 | 22046.2 |
| 181.4 | 400 | 881.8 | 2177.2 | 4800 | 10582.2 | 4581.3 | 10100 | 22266.7 |
| 186.0 | 410 | 903.9 | 2222.6 | 4900 | 10802.7 | 4626.6 | 10200 | 22487.2 |
| 190.5 | 420 | 925.9 | 2268.0 | 5000 | 11023.1 | 4672.0 | 10300 | 22707.6 |
| 195.0 | 430 | 948.0 | 2313.3 | 5100 | 11243.6 | 4717.4 | 10400 | 22928.1 |
| 199.6 | 440 | 970.0 | 2358.7 | 5200 | 11464.0 | 4762.7 | 10500 | 23148.5 |

WT_CONVERSION

**Volume Conversion**

To convert from liters to gallons, find, in bold face columns, the number representing the liters volume to be converted. The equivalent gallons volume is read in the adjacent column headed gallons.

To convert from gallons to liters, find, in bold face columns, the number representing the gallons volume to be converted. The equivalent liters volume is read in the adjacent column headed liters.

| Volume Conversion | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Liters | ◀ ▶ | Gallons | Liters | ◀ ▶ | Gallons | Liters | ◀ ▶ | Gallons |
| 3.8 | 1 | 0.3 | 1324.9 | 350 | 92.5 | 2952.6 | 780 | 206.1 |
| 7.6 | 2 | 0.5 | 1362.7 | 360 | 95.1 | 2990.5 | 790 | 208.7 |
| 11.4 | 3 | 0.8 | 1400.6 | 370 | 97.7 | 3028.3 | 800 | 211.3 |
| 15.1 | 4 | 1.1 | 1438.5 | 380 | 100.4 | 3066.2 | 810 | 214.0 |
| 18.9 | 5 | 1.3 | 1476.3 | 390 | 103.0 | 3104.0 | 820 | 216.6 |
| 22.7 | 6 | 1.6 | 1514.2 | 400 | 105.7 | 3141.9 | 830 | 219.3 |
| 26.5 | 7 | 1.8 | 1552.0 | 410 | 108.3 | 3179.7 | 840 | 221.9 |
| 30.3 | 8 | 2.1 | 1589.9 | 420 | 111.0 | 3217.6 | 850 | 224.5 |
| 34.1 | 9 | 2.4 | 1627.7 | 430 | 113.6 | 3255.5 | 860 | 227.2 |
| 37.9 | 10 | 2.6 | 1665.6 | 440 | 116.2 | 3293.3 | 870 | 229.8 |
| 75.7 | 20 | 5.3 | 1703.4 | 450 | 118.9 | 3331.2 | 880 | 232.5 |
| 113.6 | 30 | 7.9 | 1741.3 | 460 | 121.5 | 3369.0 | 890 | 235.1 |
| 151.4 | 40 | 10.6 | 1779.1 | 470 | 124.2 | 3406.9 | 900 | 237.8 |
| 189.3 | 50 | 13.2 | 1817.0 | 480 | 126.8 | 3444.7 | 910 | 240.4 |
| 227.1 | 60 | 15.9 | 1854.9 | 490 | 129.4 | 3482.6 | 920 | 243.0 |
| 265.0 | 70 | 18.5 | 1892.7 | 500 | 132.1 | 3520.4 | 930 | 245.7 |
| 302.8 | 80 | 21.1 | 1930.6 | 510 | 134.7 | 3558.3 | 940 | 248.3 |
| 340.7 | 90 | 23.8 | 1968.4 | 520 | 137.4 | 3596.1 | 950 | 251.0 |
| 378.5 | 100 | 26.4 | 2006.3 | 530 | 140.0 | 3634.0 | 960 | 253.6 |
| 416.4 | 110 | 29.1 | 2044.1 | 540 | 142.7 | 3671.8 | 970 | 256.2 |
| 454.2 | 120 | 31.7 | 2082.0 | 550 | 145.3 | 3709.7 | 980 | 258.9 |
| 492.1 | 130 | 34.3 | 2119.8 | 560 | 147.9 | 3747.6 | 990 | 261.5 |
| 530.0 | 140 | 37.0 | 2157.7 | 570 | 150.6 | 3785.4 | 1000 | 264.2 |
| 567.8 | 150 | 39.6 | 2195.5 | 580 | 153.2 | 4164.0 | 1100 | 290.6 |
| 605.7 | 160 | 42.3 | 2233.4 | 590 | 155.9 | 4542.5 | 1200 | 317.0 |
| 643.5 | 170 | 44.9 | 2271.2 | 600 | 158.5 | 4921.0 | 1300 | 343.4 |
| 681.4 | 180 | 47.6 | 2309.1 | 610 | 161.1 | 5299.6 | 1400 | 369.8 |
| 719.2 | 190 | 50.2 | 2347.0 | 620 | 163.8 | 5678.1 | 1500 | 396.3 |
| 757.1 | 200 | 52.8 | 2384.8 | 630 | 166.4 | 6056.7 | 1600 | 422.7 |
| 794.9 | 210 | 55.5 | 2422.7 | 640 | 169.1 | 6435.2 | 1700 | 449.1 |
| 832.8 | 220 | 58.1 | 2460.5 | 650 | 171.7 | 6813.7 | 1800 | 475.5 |
| 870.6 | 230 | 60.8 | 2498.4 | 660 | 174.4 | 7192.3 | 1900 | 501.9 |
| 908.5 | 240 | 63.4 | 2536.2 | 670 | 177.0 | 7570.8 | 2000 | 528.3 |
| 946.4 | 250 | 66.0 | 2574.1 | 680 | 179.6 | 7949.4 | 2100 | 554.8 |
| 984.2 | 260 | 68.7 | 2611.9 | 690 | 182.3 | 8327.9 | 2200 | 581.2 |
| 1022.1 | 270 | 71.3 | 2649.8 | 700 | 184.9 | 8706.4 | 2300 | 607.6 |
| 1059.9 | 280 | 74.0 | 2687.6 | 710 | 187.6 | 9085.0 | 2400 | 634.0 |
| 1097.8 | 290 | 76.6 | 2725.5 | 720 | 190.2 | 9463.5 | 2500 | 660.4 |
| 1135.6 | 300 | 79.3 | 2763.4 | 730 | 192.8 | 9842.1 | 2600 | 686.8 |
| 1173.5 | 310 | 81.9 | 2801.2 | 740 | 195.5 | 10220.6 | 2700 | 713.3 |
| 1211.3 | 320 | 84.5 | 2839.1 | 750 | 198.1 | 10599.2 | 2800 | 739.7 |
| 1249.2 | 330 | 87.2 | 2876.9 | 760 | 200.8 | 10977.7 | 2900 | 766.1 |
| 1287.0 | 340 | 89.8 | 2914.8 | 770 | 203.4 | 11356.2 | 3000 | 792.5 |

VOL_CONVERSION

## Length Conversion

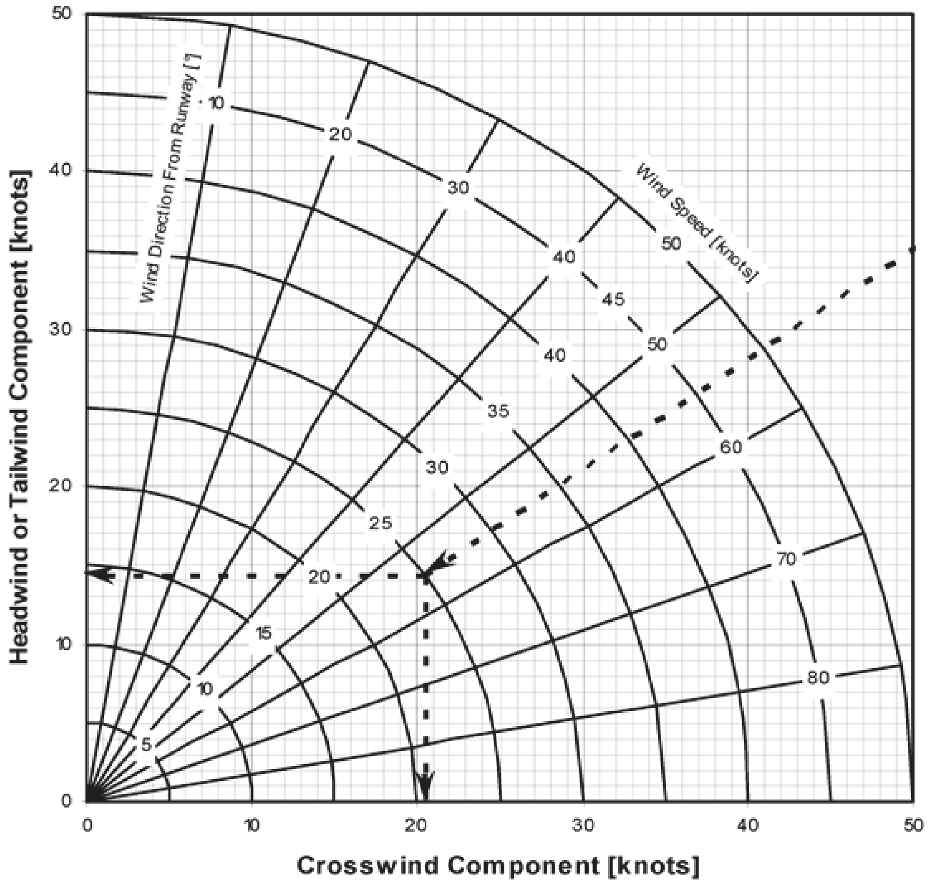
To convert from meters to feet, find, in bold face columns, the number representing the meters length to be converted. The equivalent feet are read in the adjacent column headed, Feet.

To convert from feet to meters, find, in bold face columns, the number representing the feet length to be converted. The equivalent meters are read in the adjacent column headed, Meters.

| Length Conversion | | | | | |
|---|---|---|---|---|---|
| Meters | ◄ ► | Feet | Meters | ◄ ► | Feet |
| 0.3 | **1** | 3 | 365.8 | **1200** | 3937 |
| 0.6 | **2** | 7 | 396.2 | **1300** | 4265 |
| 0.9 | **3** | 10 | 426.7 | **1400** | 4593 |
| 1.2 | **4** | 13 | 457.2 | **1500** | 4921 |
| 1.5 | **5** | 16 | 487.7 | **1600** | 5249 |
| 1.8 | **6** | 20 | 518.2 | **1700** | 5577 |
| 2.1 | **7** | 23 | 548.6 | **1800** | 5906 |
| 2.4 | **8** | 26 | 579.1 | **1900** | 6234 |
| 2.7 | **9** | 30 | 609.6 | **2000** | 6562 |
| 3.0 | **10** | 33 | 640.1 | **2100** | 6890 |
| 6.1 | **20** | 66 | 670.6 | **2200** | 7218 |
| 9.1 | **30** | 98 | 701.0 | **2300** | 7546 |
| 12.2 | **40** | 131 | 731.5 | **2400** | 7874 |
| 15.2 | **50** | 164 | 762.0 | **2500** | 8202 |
| 18.3 | **60** | 197 | 792.5 | **2600** | 8530 |
| 21.3 | **70** | 230 | 823.0 | **2700** | 8858 |
| 24.4 | **80** | 262 | 853.4 | **2800** | 9186 |
| 27.4 | **90** | 295 | 883.9 | **2900** | 9514 |
| 30.5 | **100** | 328 | 914.4 | **3000** | 9843 |
| 45.7 | **150** | 492 | 944.9 | **3100** | 10171 |
| 61.0 | **200** | 656 | 975.4 | **3200** | 10499 |
| 76.2 | **250** | 820 | 1005.8 | **3300** | 10827 |
| 91.4 | **300** | 984 | 1036.3 | **3400** | 11155 |
| 106.7 | **350** | 1148 | 1066.8 | **3500** | 11483 |
| 121.9 | **400** | 1312 | 1097.3 | **3600** | 11811 |
| 137.2 | **450** | 1476 | 1127.8 | **3700** | 12139 |
| 152.4 | **500** | 1640 | 1158.2 | **3800** | 12467 |
| 167.6 | **550** | 1804 | 1188.7 | **3900** | 12795 |
| 182.9 | **600** | 1969 | 1219.2 | **4000** | 13123 |
| 198.1 | **650** | 2133 | 1249.7 | **4100** | 13451 |
| 213.4 | **700** | 2297 | 1280.2 | **4200** | 13780 |
| 228.6 | **750** | 2461 | 1310.6 | **4300** | 14108 |
| 243.8 | **800** | 2625 | 1341.1 | **4400** | 14436 |
| 259.1 | **850** | 2789 | 1371.6 | **4500** | 14764 |
| 274.3 | **900** | 2953 | 1402.1 | **4600** | 15092 |
| 289.6 | **950** | 3117 | 1432.6 | **4700** | 15420 |
| 304.8 | **1000** | 3281 | 1463.0 | **4800** | 15748 |
| 335.3 | **1100** | 3609 | 1493.5 | **4900** | 16076 |

LEN_CONVERSION

## Wind Components




**Example:**

**Ambient Conditions:**

| | |
|---|---|
| Wind Speed | 25 knots |
| Wind Direction | 175° |

**Using the Chart:**

| | | |
|---|---|---|
| 1. | Runway Heading | 230° |
| 2. | Wind Direction from Runway | 55° |
| 3. | Wind Velocity | 25 knots |
| 4. | Headwind Component | 14.3 knots |
| 5. | Crosswind Component | 20.5 knots |

## ACOUSTIC LEVELS

The following noise levels comply with part 36, Appendix B, Stage 4 maximum noise level requirements and were obtained by analysis of approved data from noise tests conducted under the provisions of part 36, Amendment 36-29. The noise measurement and evaluation procedures used to obtain these noise levels are considered by the FAA to be equivalent to the Chapter 4 noise level required by the International Civil Aviation Organization (ICAO) in Annex 16, Volume I, Appendix 2, Amendment 10, effective July 2011.

No determination has been made by the Federal Aviation Administration that the noise levels of this aircraft are or should be acceptable or unacceptable for operation at, into, or out of any airport.

These noise values are stated for reference conditions per a standard acoustic atmospheric day, defined as ISA sea level pressure, 25 °C ambient temperature (ISA + 10 °C), 70 % relative humidity, no runway slope and zero wind.

Flyover and lateral noise levels were determined for the maximum takeoff weight of 10,600 lbs., TO/APPR flap setting, climb speed of $V_2$ + 15 KIAS. For Flyover, a thrust cutback altitude of 3,300 ft AGL (nominally) was used. Approach noise levels were determined for the maximum landing weight of 9,860 lbs., LDG flap setting, approach speed of $V_{REF}$ + 10 KIAS, landing gear down (DN) and a glideslope of 3 degrees.

## CERTIFICATION NOISE LEVELS

The demonstrated effective perceived noise levels (EPNdB), noise limits and margins of compliance to Title 14 CFR 36, Stage 4, and ICAO Annex 16, Volume I, Chapter 4 are listed below:

| **Reference Condition** | **Certification Noise Level [EPNdb]** | **Maximum Allowable Requirement [EPNdb]** |
|---|---|---|
| Flyover | 72.9 | 89.0 |
| Lateral | 85.4 | 94.0 |
| Approach | 87.5 | 98.0 |

ICAO Annex 16, Volume I, Chapter 4 and 14 CFR 36 Stage 4 compliance has been demonstrated with a minimum -8.6 EPNdB margin.

## GENERAL INFORMATION

| PRIMARY AIRSPEED POSITION ERROR CORRECTION - dV | |
|---|---|
| INDICATED AIRSPEED [KIAS] | dV [knots] |
| 100 | -1 |
| 125 | -1 |
| 150 | -1 |
| 175 | -1 |
| 200 | -1 |
| 225 | -1 |
| 250 | -1 |
| 270 | -1 |

CSP-SSEC-AS-03

dV = KCAS - KIAS

**Airspeed Correction** (continued)

| STDBY AIRSPEED POSITION ERROR CORRECTION - dV | | | |
|---|---|---|---|
| INDICATED AIRSPEED [KIAS] | dV [knots] | | |
| | Flaps UP | Flaps TO/APPR | Flaps LDG |
| 100 | -5 | -2 | -2 |
| 125 | -3 | -1 | -1 |
| 150 | -1 | -1 | -1 |
| 175 | -1 | -1 | -1 |
| 200 | -1 | -1 | -1 |
| 225 | -1 | -1 | -1 |
| 250 | -1 | -1 | -1 |
| 270 | -1 | -1 | -1 |

STB-SSEC-AS-03

dV = KCAS - KIAS

## Altimeter Correction

| PRIMARY ALTITUDE POSITION ERROR CORRECTION - dH | | | |
|---|---|---|---|
| INDICATED AIRSPEED [KIAS] | dH [feet] | | |
| | Up to FL200 | FL300 | FL400 |
| 100 | 10 | 5 | -15 |
| 125 | 5 | -5 | -25 |
| 150 | -5 | -15 | -35 |
| 175 | -5 | -20 | -40 |
| 200 | -10 | -25 | -30 |
| 225 | -10 | -25 | -30 |
| 250 | -15 | -20 | |
| 270 | -15 | -30 | |

CSP-SSEC-HP-03

dH = Calibrated - Indicated Altitude

Note: Altitude correction is less than 10 feet for Flaps TO/APPR and LDG

**Altimeter Correction** (continued)

| STDBY ALTITUDE POSITION ERROR CORRECTION - dH | | | |
|---|---|---|---|
| INDICATED AIRSPEED [KIAS] | dH [feet] | | |
| | Flaps UP | Flaps TO/APPR | Flaps LDG |
| 100 | -70 | -25 | -15 |
| 125 | -40 | -5 | 0 |
| 150 | -10 | 5 | -5 |
| 175 | 0 | -5 | -25 |
| 200 | 0 | -10 | |
| 225 | -10 | | |
| 250 | -25 | | |
| 270 | -45 | | |

STB-SSEC-HP-03

dH = Calibrated - Indicated Altitude

## Stall Speeds

| Reference Stall Speed [KIAS]* | | | | |
|---|---|---|---|---|
| FLAPS UP | | | | |
| Weight [lb] | Bank Angle [deg] | | | |
| | 0 | 30 | 45 | 60 |
| 7000 | 89 | 95 | 106 | 126 |
| 7800 | 94 | 101 | 111 | 133 |
| 8200 | 96 | 103 | 114 | 136 |
| 8600 | 98 | 106 | 117 | 139 |
| 8800 | 100 | 107 | 118 | 141 |
| 9000 | 101 | 108 | 120 | 142 |
| 9400 | 103 | 110 | 122 | 145 |
| 9800 | 105 | 113 | 125 | 148 |
| 10200 | 107 | 115 | 127 | 151 |
| 10300 | 107 | 115 | 128 | 152 |
| 10600 | 109 | 117 | 129 | 154 |

| Reference Stall Speed [KIAS]* | | | | |
|---|---|---|---|---|
| Flaps TO/APPR | | | | |
| Weight [lb] | Bank Angle [deg] | | | |
| | 0 | 30 | 45 | 60 |
| 7000 | 81 | 87 | 96 | 114 |
| 7800 | 85 | 92 | 101 | 120 |
| 8200 | 87 | 94 | 104 | 123 |
| 8600 | 89 | 96 | 106 | 126 |
| 8800 | 90 | 97 | 108 | 128 |
| 9000 | 92 | 98 | 109 | 129 |
| 9400 | 94 | 100 | 111 | 132 |
| 9800 | 95 | 103 | 113 | 135 |
| 10200 | 97 | 105 | 116 | 138 |
| 10300 | 98 | 105 | 116 | 138 |
| 10600 | 99 | 107 | 118 | 140 |

| Reference Stall Speed [KIAS]* | | | | |
|---|---|---|---|---|
| Flaps LDG | | | | |
| Weight [lb] | Bank Angle [deg] | | | |
| | 0 | 30 | 45 | 60 |
| 7000 | 78 | 84 | 93 | 110 |
| 7800 | 82 | 88 | 98 | 116 |
| 8200 | 84 | 91 | 100 | 119 |
| 8600 | 86 | 93 | 103 | 122 |
| 8800 | 87 | 94 | 104 | 123 |
| 9000 | 88 | 95 | 105 | 125 |
| 9400 | 90 | 97 | 107 | 127 |
| 9800 | 92 | 99 | 109 | 130 |
| 10200 | 92 | 99 | 110 | 131 |
| 10300 | 94 | 101 | 112 | 133 |
| 10600 | 96 | 103 | 114 | 135 |

SS_ALL_0_LO_06

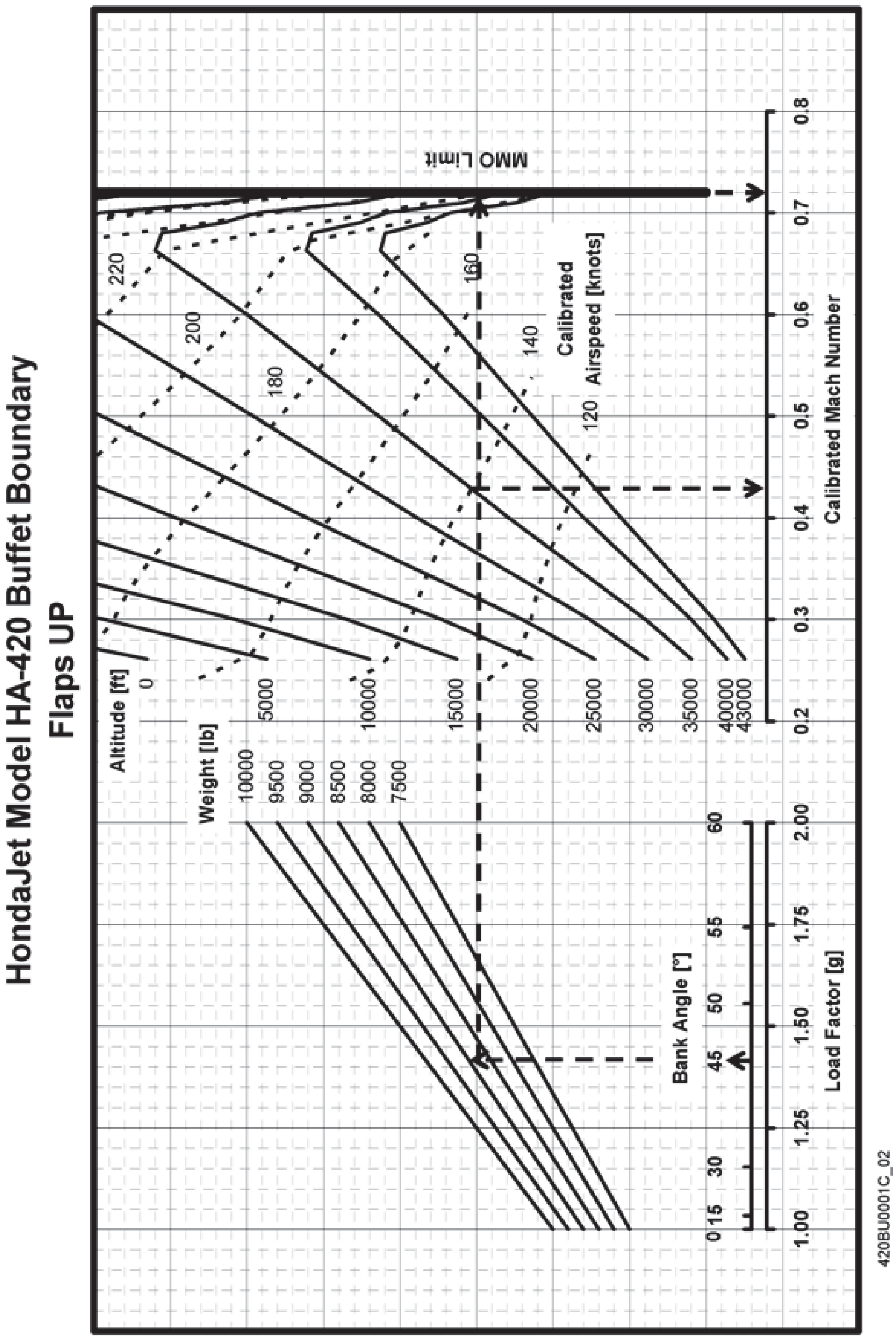
* Valid from Sea Level to 20,000 feet.

## High Altitude Stall Speeds

| Reference Stall Speed [KIAS] | | | | | | |
|---|---|---|---|---|---|---|
| FLAPS UP | | | | | | |
| Weight [lb] | Altitude [1000 ft] | | | | | |
| | 20 | 25 | 30 | 35 | 40 | 43 |
| 7000 | 89 | 91 | 94 | 97 | 102 | 106 |
| 7500 | 92 | 95 | 97 | 101 | 106 | 110 |
| 8000 | 95 | 98 | 100 | 104 | 110 | 113 |
| 8500 | 98 | 101 | 104 | 107 | 113 | 117 |
| 9000 | 101 | 104 | 107 | 111 | 116 | 121 |
| 9500 | 103 | 106 | 109 | 113 | 120 | 124 |
| 10000 | 106 | 109 | 112 | 116 | 123 | 127 |
| 10500 | 108 | 111 | 115 | 119 | 125 | 130 |

SS_UP_0_HI_06

## Buffet Boundary



**Buffet Boundary** (continued)

**Example:**

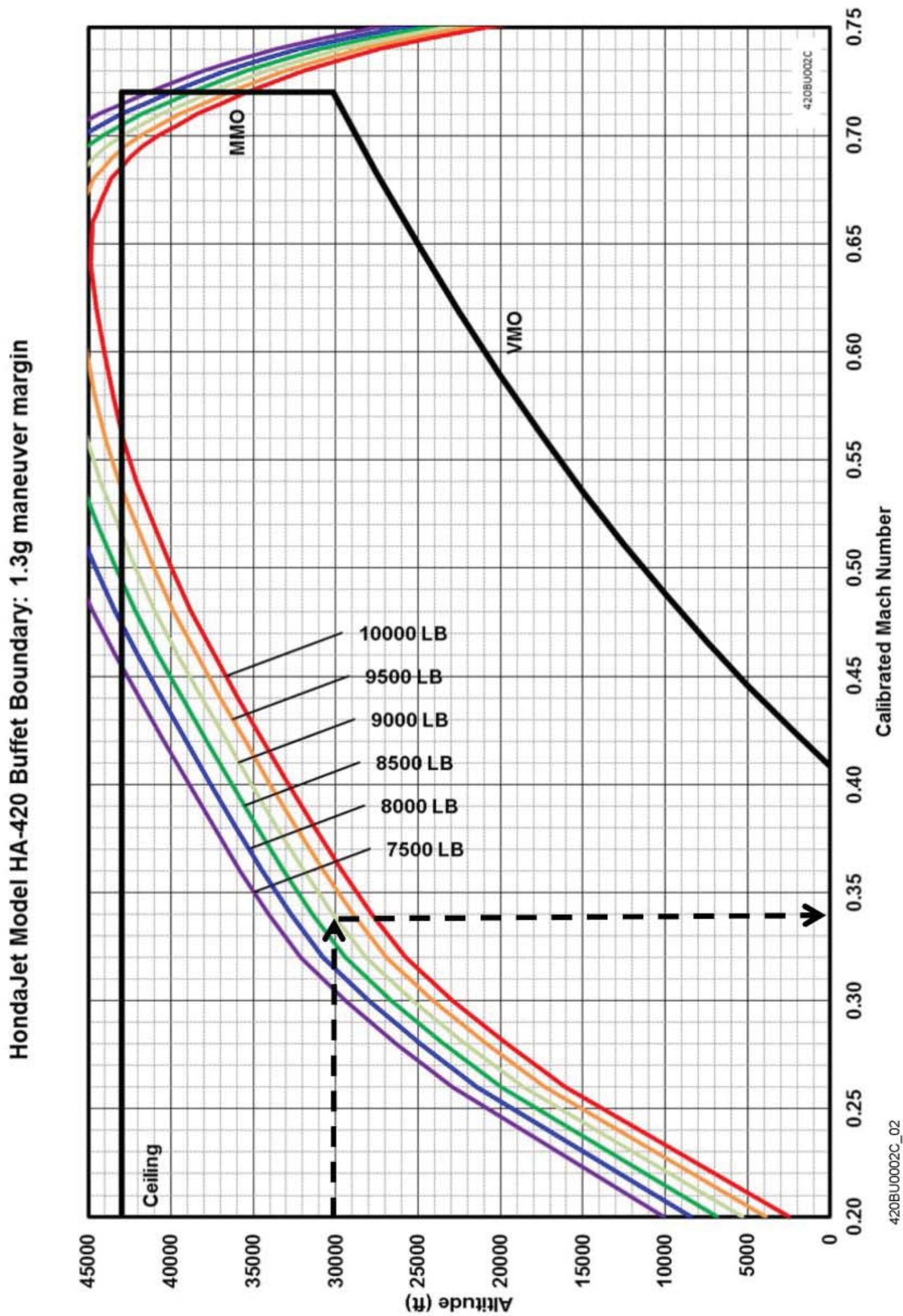
Initial Conditions:

| | |
|---|---|
| Bank Angle | 45° |
| Weight | 9000 lbs |
| Altitude | 35000 ft |

Using the Chart:

| | |
|---|---|
| 1. Low Speed Buffet Boundary | 140 kcas / 0.43M |
| 2. High Speed Buffet Boundary | 270 kcas / 0.72M |

## 1.3g Maneuver Margin



**1.3g Maneuver Margin** (continued)

**Example:**

Initial Conditions:

| | |
|---|---|
| Weight | 9000 lbs |
| Altitude | 30000 ft |

Using the Chart:

| | |
|---|---|
| 1. 1.3 g maneuver margin | 0.34 Mach |

## TAKEOFF

**Use of takeoff information tables:**

1. Determine the airplane gross weight for the desired loading and the planned airplane configuration (flaps, ice protection).
2. Obtain airport information:
   - active runway
   - available runway length
   - runway gradient
   - obstacles in the takeoff flight path
   - ambient temperature
     - Verify that the temperature is within the ambient temperature limits found in the limitations section.
   - pressure altitude
   - wind
     - Determine the wind component parallel to active runway from the crosswind component chart.
3. Check the maximum takeoff weight permitted by climb requirements and brake energy limits for the planned airplane configuration using "Maximum Takeoff Weight" charts. If any of these limitations restrict the takeoff gross weight, the pilot must off load weight until the requirement is met.
4. Using the takeoff gross weight determined in step 3 and the planned airplane takeoff configuration, determine $V_1$, $V_R$, $V_2$, attitude and uncorrected takeoff field length using the tables on pages 48 – 59 (Flaps TO/APPR, Ice Protection Off), pages 71 – 82 (Flaps TO/APPR, Ice Protection On), pages 116 – 127 (Flaps UP, Ice Protection Off) or 145 – 156 (Flaps UP, Ice Protection On).
5. For wind and runway gradients, the takeoff field length must be corrected using the correction tables on pages 63 – 67 (Flaps TO/APPR, Ice Protection Off) and 86 – 90 (Flaps TO/APPR, Ice Protection On) or 131 – 138 (Flaps UP, Ice Protection Off) and 160 – 167 (Flaps UP, Ice Protection On).

**Use of takeoff information tables (continued):**

6. If the available runway length is less than the required takeoff field length, the airplane weight must be reduced until this requirement can be met.
7. If obstacle clearance is a factor, use the Obstacle Clearance section to ensure adequate performance is available. If the required obstacle clearance is not achieved, the gross weight must be adjusted until the obstacle can be cleared.
8. The second segment takeoff net climb tables are provided on pages 91 – 97 (Flaps TO/APPR, Ice Protection Off and On) and 168 – 174 (Flaps UP, Ice Protection Off and On) with wind correction tables on pages 94, 98 ,171 and 175.
9. Final segment climb tables are provided on pages 99 – 105 (Flaps TO/APPR, Ice Protection Off and On) and 176 – 182 (Flaps UP, Ice Protection Off and On) with wind correction tables on pages 102, 106, 179 and 183.

**NOTE** If MTOW is not limited by brake energy for a given wind, a chart is not provided.

**NOTE** Ice Protection ON assumes both ENG and WING A/I are ON. If only ENG A/I is on, the Ice Protection ON tables must be used.

**NOTE** The takeoff field length provided in the performance section of the flight manual is based on a dry runway. If departing from a wet runway, it is recommended to increase the predicted takeoff field length by 30 %.

### Takeoff Pitch Trim Settings

Pitch trim for takeoff should be set per the following table.

| TOGW C.G. [% M.A.C.] | Pitch Trim Setting | |
|---|---|---|
| | Flaps UP | Flaps TO/APPR |
| 20 – 24 | 3.2 | 4.3 |
| 24 – 27 | 2.9 | 4.0 |
| 27 – 31 | 2.5 | 3.6 |

TO_PITCH_TRIM_03

## TAKEOFF – ANTI-ICE FLUID PERFORMANCE ADDITIVES

After the use of anti-ice fluids:

1. Increase $V_R$ and $V_2$ by 5
2. Increase the calculated field length by 30%.

# TAKEOFF – FLAPS TO/APPR

## Max Takeoff Weight – Climb and Brake Energy Limited

Red shading on the takeoff tables indicates conditions where the airplane does not meet the climb requirements or exceeds the brake energy limits, but can be used for interpolation.

**Example:**

Ambient Conditions:

| | |
|---|---|
| Temperature | 35 °C |
| Airport Altitude | 5500 ft |
| Wind | 10 kts Tailwind |
| Runway Gradient | -2.0 % |

Aircraft Configuration:

| | |
|---|---|
| Flaps | TO/APPR |

Bleed Setting:

| | |
|---|---|
| Ice Protection | Off |

Using the Weight Limit Charts:

| | |
|---|---|
| Climb Weight Limit | 9500 lbs |

Using the Tables:

Uncorrected

- $V_1$ — 119 KIAS
- $V_R$ — 121.5 KIAS
- $V_2$ — 122.5 KIAS
- Field Length — 6967 ft
- Climb Gradient — 1.5 %

**Example: (continued)**

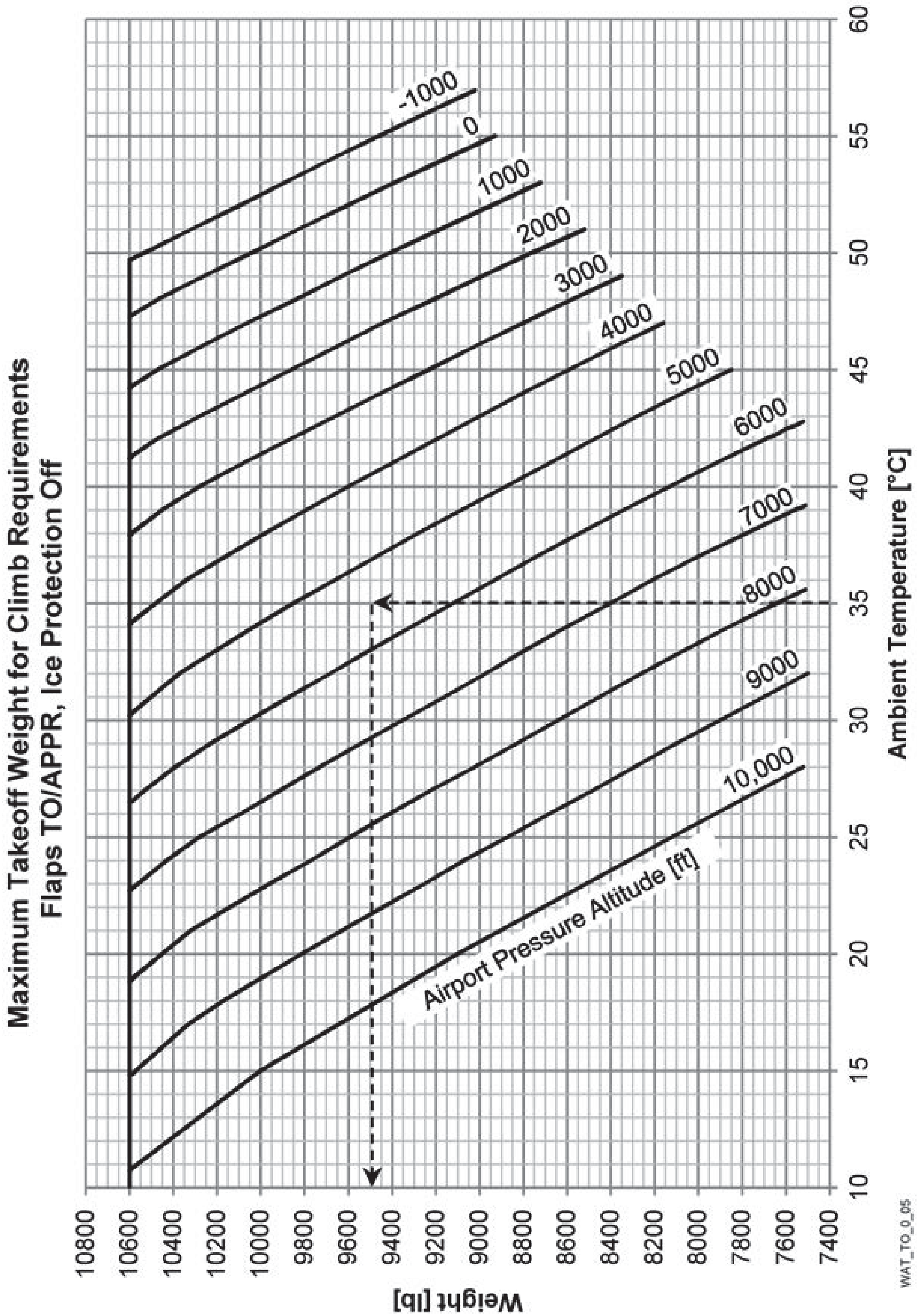
Using the Tables (continued):

Wind Correction:

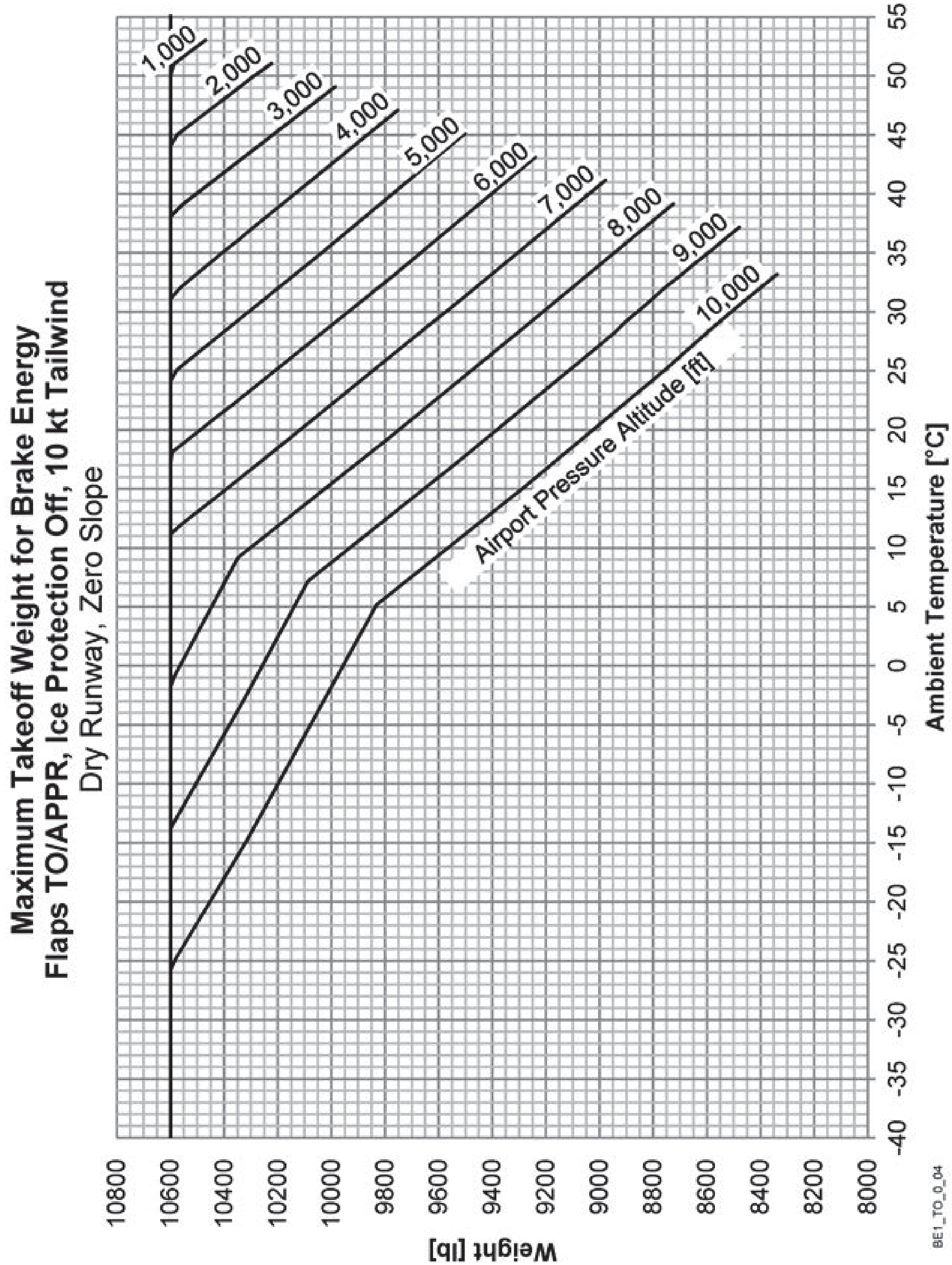
- $V_1$ 118 KIAS
- Field Length 7960 ft
- Climb Gradient 1.4 %

Slope Correction:

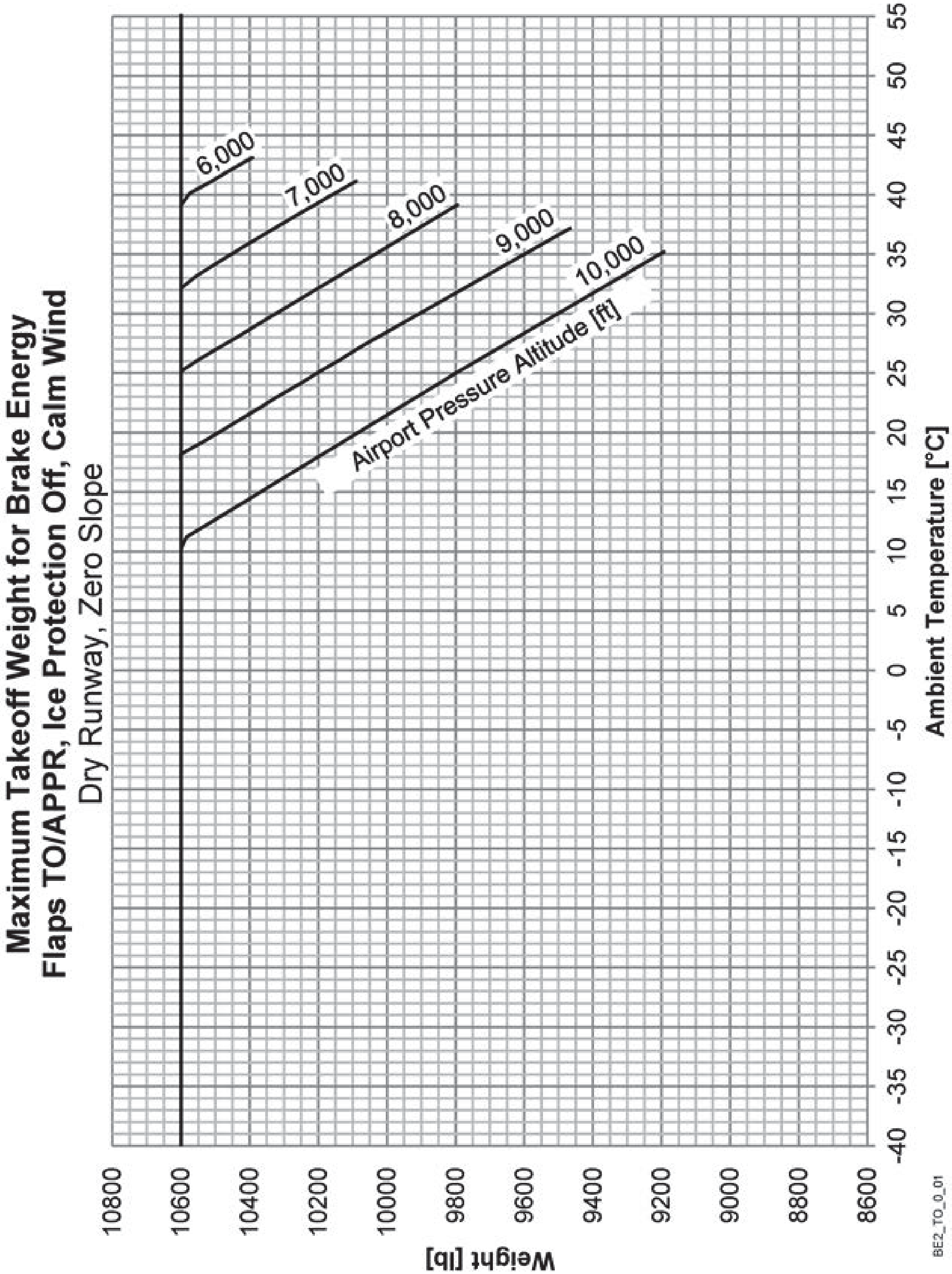
- $V_1$ 116 KIAS
- $V_2$ 124.5 KIAS
- Field Length 7565 ft



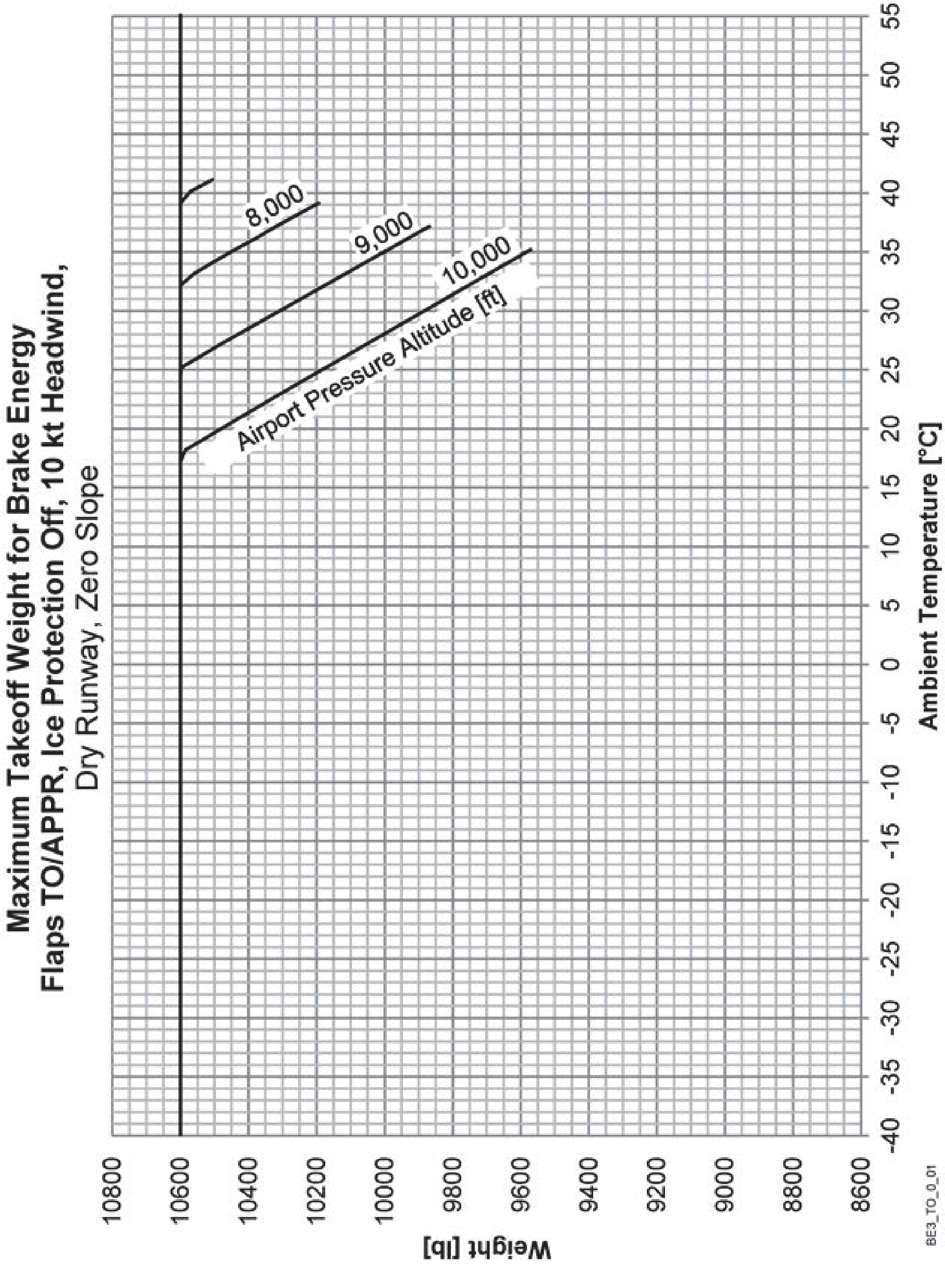
Maximum Takeoff Weight for Climb Requirements
Flaps TO/APPR, Ice Protection Off
Ambient Temperature [°C]
Weight [lb]
Airport Pressure Altitude [ft]
-1000
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10,000
10 15 20 25 30 35 40 45 50 55 60
10800 10600 10400 10200 10000 9800 9600 9400 9200 9000 8800 8600 8400 8200 8000 7800 7600 7400
WAT_TO_0_05



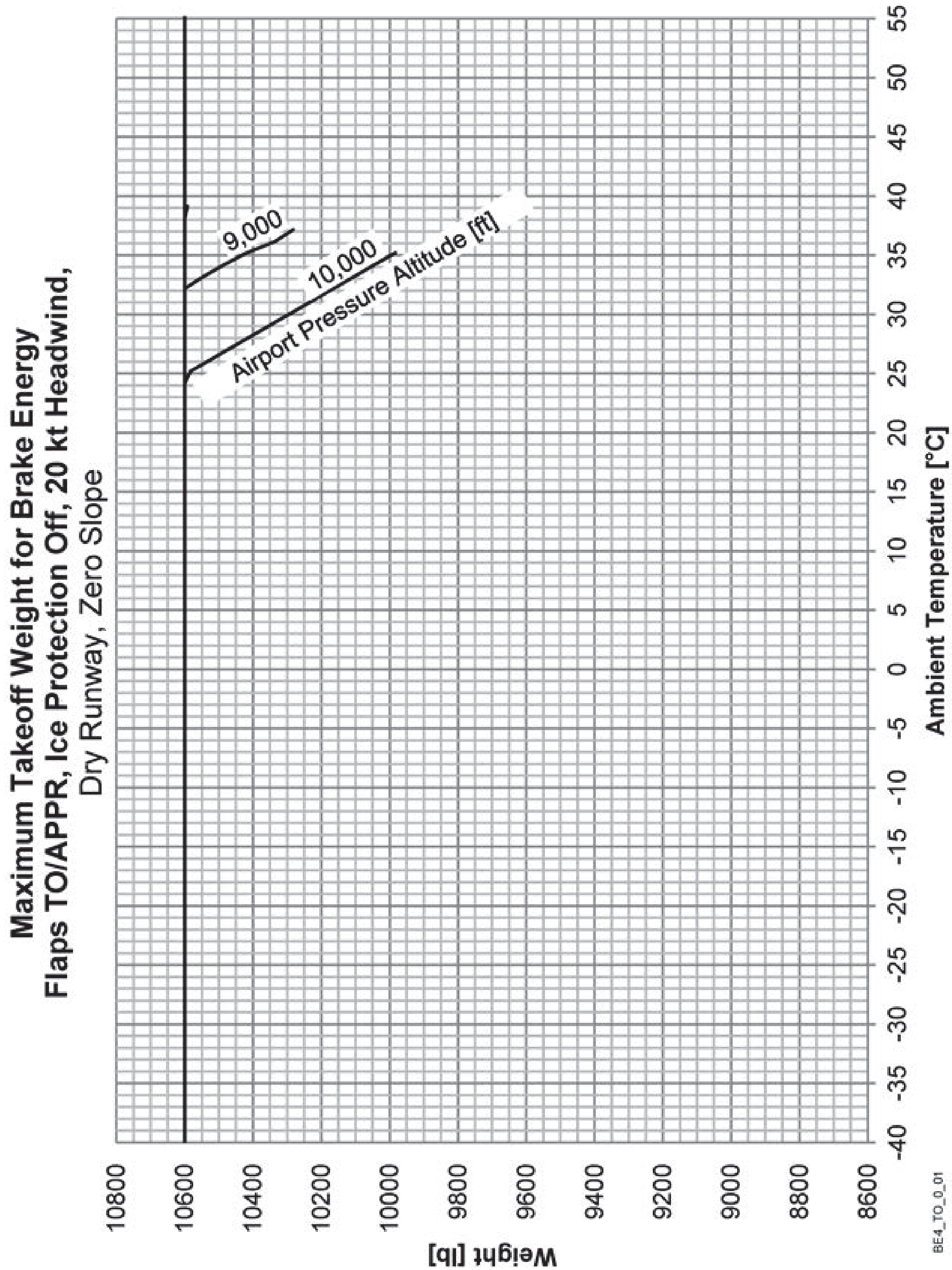
Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection Off, 10 kt Tailwind
Dry Runway, Zero Slope
Airport Pressure Altitude [ft]
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Ambient Temperature [°C]
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
8800
8600
8400
8200
8000
BE1_TO_0_04



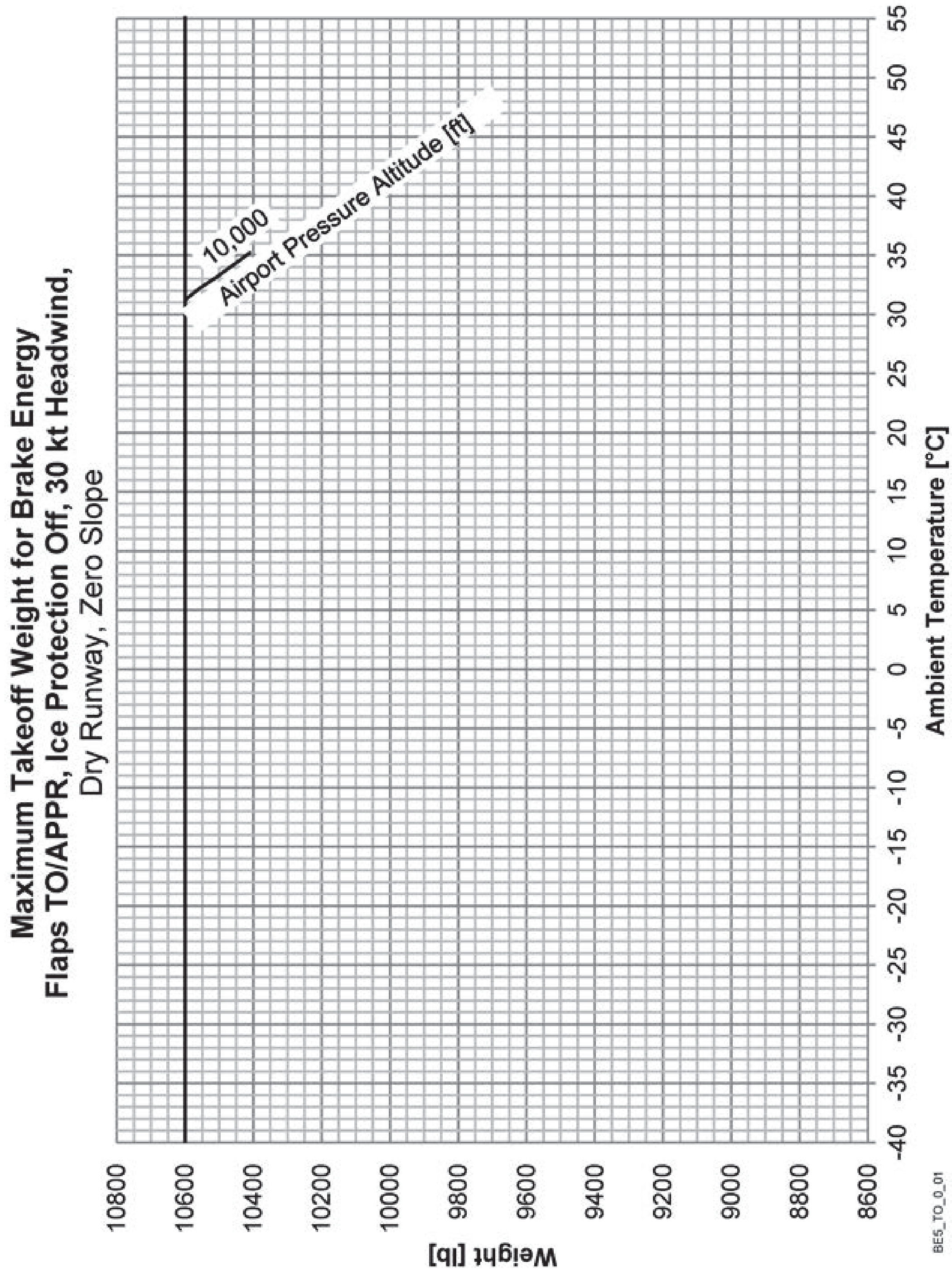
Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection Off, Calm Wind
Dry Runway, Zero Slope
6,000
7,000
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
8800
8600
BE2_TO_0_01



Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection Off, 10 kt Headwind,
Dry Runway, Zero Slope
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
55 50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40
Weight [lb]
10800 10600 10400 10200 10000 9800 9600 9400 9200 9000 8800 8600
BE3_TO_0_01



Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection Off, 20 kt Headwind,
Dry Runway, Zero Slope
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
55 50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40
Weight [lb]
10800 10600 10400 10200 10000 9800 9600 9400 9200 9000 8800 8600
BE4_TO_0_01



Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection Off, 30 kt Headwind,
Dry Runway, Zero Slope
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
Weight [lb]
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
8800
8600
BE5_TO_0_01

| Slope Corrected Maximum Takeoff Weight for Brake Energy [lb] | | | | |
|---|---|---|---|---|
| Flaps TO/APPR, Ice Protection Off | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 7564 | 7698 | **7800** | 8110 | 8605 |
| 7659 | 7795 | **7900** | 8202 | 8683 |
| 7753 | 7891 | **8000** | 8294 | 8760 |
| 7848 | 7988 | **8100** | 8386 | 8838 |
| 7942 | 8084 | **8200** | 8479 | 8915 |
| 8037 | 8181 | **8300** | 8571 | 8993 |
| 8131 | 8277 | **8400** | 8663 | 9070 |
| 8226 | 8374 | **8500** | 8755 | 9148 |
| 8320 | 8470 | **8600** | 8847 | 9225 |
| 8415 | 8567 | **8700** | 8939 | 9303 |
| 8509 | 8663 | **8800** | 9031 | 9380 |
| 8604 | 8760 | **8900** | 9124 | 9458 |
| 8698 | 8856 | **9000** | 9216 | 9535 |
| 8793 | 8953 | **9100** | 9308 | 9613 |
| 8887 | 9049 | **9200** | 9400 | 9690 |
| 8982 | 9146 | **9300** | 9492 | 9768 |
| 9076 | 9242 | **9400** | 9584 | 9845 |
| 9171 | 9339 | **9500** | 9676 | 9923 |
| 9265 | 9435 | **9600** | 9769 | 10000 |
| 9360 | 9532 | **9700** | 9861 | 10078 |
| 9454 | 9628 | **9800** | 9953 | 10155 |
| 9549 | 9725 | **9900** | 10045 | 10233 |
| 9643 | 9821 | **10000** | 10137 | 10310 |
| 9738 | 9918 | **10100** | 10229 | 10388 |
| 9832 | 10014 | **10200** | 10321 | 10465 |
| 9927 | 10111 | **10300** | 10414 | 10543 |
| 10021 | 10207 | **10400** | 10506 | 10600 |
| 10116 | 10304 | **10500** | 10598 | 10600 |
| 10210 | 10400 | **10600** | 10600 | 10600 |

BESC1_TO_0_04

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps TO/APPR, Ice Protection Off, Altitude -1000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 124 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2698 | 2726 | 2797 | 2868 | 2939 | 3081 | 3204 |
| 15 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 119 | 120 |
| | TOFL | 3182 | 3214 | 3304 | 3393 | 3482 | 3627 | 3809 |
| 25 | V1 | 106 | 106 | 106 | 107 | 107 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 119 | 120 |
| | TOFL | 3275 | 3300 | 3393 | 3485 | 3577 | 3720 | 3913 |
| 35 | V1 | 106 | 107 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 120 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3532 | 3574 | 3679 | 3852 | 4030 | 4199 | 4438 |
| 40 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 113 | 115 | 115 | 116 | 118 | 119 |
| | V2 | 120 | 119 | 120 | 120 | 120 | 121 | 121 |
| | TOFL | 3715 | 3772 | 4011 | 4160 | 4366 | 4581 | 4840 |
| 45 | V1 | 110 | 110 | 112 | 113 | 115 | 116 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 120 | 119 | 120 | 120 | 121 | 121 | 122 |
| | TOFL | 4072 | 4123 | 4336 | 4565 | 4798 | 5033 | 5316 |
| 50 | V1 | 112 | 113 | 114 | 116 | 117 | 118 | 120 |
| | VR | 117 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 4458 | 4559 | 4812 | 5055 | 5312 | 5569 | 5882 |
| 55 | V1 | 115 | 116 | 117 | 118 | 119 | 121 | 122 |
| | VR | 119 | 119 | 120 | 121 | 122 | 123 | 124 |
| | V2 | 121 | 121 | 122 | 122 | 123 | 123 | 124 |
| | TOFL | 4977 | 5087 | 5364 | 5643 | 5915 | 6201 | 6610 |

TOFL_TO_0_-1_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude Sea Level** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2781 | 2810 | 2884 | 2958 | 3032 | 3187 | 3318 |
| 15 | V1 | 105 | 106 | 106 | 107 | 108 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 119 | 119 | 120 |
| | TOFL | 3282 | 3314 | 3407 | 3500 | 3593 | 3750 | 3934 |
| 25 | V1 | 105 | 106 | 106 | 107 | 107 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 119 | 120 |
| | TOFL | 3378 | 3404 | 3500 | 3597 | 3693 | 3849 | 4045 |
| 35 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 114 | 115 | 115 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3698 | 3742 | 3891 | 4111 | 4265 | 4472 | 4728 |
| 40 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 116 | 117 | 118 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 3959 | 4062 | 4227 | 4448 | 4677 | 4908 | 5186 |
| 45 | V1 | 110 | 111 | 113 | 114 | 116 | 117 | 118 |
| | VR | 115 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 120 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 4312 | 4413 | 4661 | 4901 | 5151 | 5404 | 5709 |
| 50 | V1 | 114 | 114 | 116 | 117 | 118 | 119 | **120** |
| | VR | 118 | 118 | 119 | 120 | 121 | 122 | **123** |
| | V2 | 121 | 121 | 121 | 122 | 122 | 123 | **123** |
| | TOFL | 4807 | 4916 | 5187 | 5460 | 5726 | 6005 | **6343** |
| 55 | V1 | 117 | 117 | 118 | **120** | **121** | **122** | **123** |
| | VR | 120 | 120 | 121 | **122** | **123** | **123** | **124** |
| | V2 | 122 | 122 | 122 | **123** | **123** | **123** | **124** |
| | TOFL | 5387 | 5506 | 5805 | **6107** | **6400** | **6714** | **7142** |

TOFL_TO_0_0_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude 1000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 109 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 2892 | 2923 | 3002 | 3081 | 3197 | 3352 | 3493 |
| 15 | V1 | 106 | 106 | 106 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3410 | 3450 | 3548 | 3646 | 3756 | 3957 | 4127 |
| 25 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3548 | 3590 | 3694 | 3798 | 3959 | 4152 | 4347 |
| 30 | V1 | 106 | 107 | 107 | 109 | 110 | 112 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 3721 | 3766 | 3879 | 4094 | 4254 | 4455 | 4710 |
| 35 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 113 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 120 | 120 | 120 | 121 | 121 |
| | TOFL | 3914 | 3998 | 4236 | 4404 | 4626 | 4856 | 5133 |
| 40 | V1 | 110 | 110 | 112 | 113 | 115 | 116 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 120 | 119 | 120 | 120 | 121 | 121 | 122 |
| | TOFL | 4290 | 4345 | 4583 | 4829 | 5078 | 5329 | 5631 |
| 45 | V1 | 112 | 113 | 114 | 116 | 117 | 118 | **120** |
| | VR | 117 | 117 | 118 | 119 | 120 | 121 | **122** |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | **123** |
| | TOFL | 4707 | 4814 | 5084 | 5354 | 5617 | 5891 | **6225** |
| 50 | V1 | 115 | 116 | 117 | 119 | **120** | **121** | **122** |
| | VR | 119 | 119 | 120 | 121 | **122** | **123** | **124** |
| | V2 | 121 | 121 | 122 | 122 | **123** | **123** | **124** |
| | TOFL | 5257 | 5375 | 5670 | 5968 | **6257** | **6562** | **6961** |

TOFL_TO_0_1_06

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps TO/APPR, Ice Protection Off, Altitude 2000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 3008 | 3041 | 3124 | 3208 | 3365 | 3495 | 3674 |
| 10 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3501 | 3542 | 3644 | 3746 | 3900 | 4094 | 4281 |
| 20 | V1 | 105 | 106 | 106 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3598 | 3641 | 3747 | 3853 | 4007 | 4213 | 4402 |
| 30 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 115 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 3941 | 3990 | 4218 | 4391 | 4609 | 4839 | 5117 |
| 35 | V1 | 109 | 110 | 111 | 112 | 114 | 115 | 117 |
| | VR | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 120 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 4263 | 4357 | 4545 | 4782 | 5031 | 5280 | 5582 |
| 40 | V1 | 111 | 112 | 113 | 115 | 116 | 117 | 119 |
| | VR | 116 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 120 | 120 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 4625 | 4725 | 5000 | 5259 | 5530 | 5803 | 6133 |
| 45 | V1 | 114 | 115 | 116 | 117 | 118 | 120 | 121 |
| | VR | 118 | 118 | 119 | 120 | 121 | 122 | 123 |
| | V2 | 121 | 121 | 121 | 122 | 122 | 123 | 123 |
| | TOFL | 5141 | 5258 | 5550 | 5844 | 6129 | 6430 | 6795 |
| 50 | V1 | 117 | 118 | 119 | 120 | 121 | 122 | 123 |
| | VR | 120 | 120 | 121 | 122 | 123 | 124 | 124 |
| | V2 | 122 | 122 | 122 | 123 | 123 | 124 | 124 |
| | TOFL | 5761 | 5889 | 6211 | 6536 | 6852 | 7187 | 7614 |

TOFL_TO_0_2_06

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection Off, Altitude 3000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 117 |
| | V2 | 122 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3132 | 3167 | 3255 | 3370 | 3552 | 3670 | 3870 |
| 10 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3648 | 3691 | 3799 | 3908 | 4117 | 4276 | 4513 |
| 20 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 117 |
| | V2 | 121 | 120 | 120 | 119 | 119 | 119 | 120 |
| | TOFL | 3776 | 3821 | 3935 | 4064 | 4293 | 4448 | 4702 |
| 25 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 119 | 120 | 121 |
| | TOFL | 3970 | 4019 | 4199 | 4423 | 4607 | 4836 | 5115 |
| 30 | V1 | 108 | 109 | 110 | 112 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4241 | 4353 | 4536 | 4776 | 5026 | 5277 | 5580 |
| 35 | V1 | 110 | 111 | 112 | 114 | 115 | 116 | 118 |
| | VR | 115 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 4587 | 4697 | 4964 | 5225 | 5496 | 5768 | 6098 |
| 40 | V1 | 113 | 113 | 115 | 116 | 117 | 119 | 120 |
| | VR | 117 | 118 | 119 | 120 | 121 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 122 | 122 | 122 | 123 |
| | TOFL | 5052 | 5169 | 5460 | 5752 | 6036 | 6335 | 6695 |
| 45 | V1 | 116 | 116 | 118 | 119 | 120 | 121 | 122 |
| | VR | 119 | 120 | 121 | 121 | 122 | 123 | 124 |
| | V2 | 121 | 121 | 122 | 122 | 123 | 123 | 124 |
| | TOFL | 5627 | 5754 | 6073 | 6393 | 6705 | 7034 | 7436 |

TOFL_TO_0_3_06

# Honda Aircraft Company



| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind<br>Flaps TO/APPR, Ice Protection Off, Altitude 4000 feet | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 107 | 107 | 108 | 109 | 111 | 112 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 121 | 120 | 120 | 120 | 120 | 121 |
| | TOFL | 3263 | 3301 | 3395 | 3555 | 3712 | 3867 | 4083 |
| 10 | V1 | 106 | 106 | 107 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 114 | 115 | 115 | 117 |
| | V2 | 121 | 120 | 119 | 119 | 120 | 119 | 120 |
| | TOFL | 3806 | 3852 | 3967 | 4125 | 4351 | 4510 | 4769 |
| 20 | V1 | 106 | 106 | 107 | 109 | 110 | 112 | 113 |
| | VR | 113 | 113 | 113 | 115 | 115 | 116 | 118 |
| | V2 | 120 | 120 | 118 | 119 | 119 | 120 | 121 |
| | TOFL | 4001 | 4050 | 4192 | 4447 | 4609 | 4836 | 5116 |
| 25 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 119 | 120 | 121 | 121 |
| | TOFL | 4224 | 4333 | 4568 | 4776 | 5024 | 5276 | 5580 |
| 30 | V1 | 110 | 110 | 112 | 113 | 115 | 116 | 117 |
| | VR | 115 | 115 | 116 | 117 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 120 | 121 | 121 | 122 |
| | TOFL | 4621 | 4693 | 4964 | 5226 | 5499 | 5773 | 6104 |
| 35 | V1 | 112 | 113 | 114 | 115 | 117 | 118 | 119 |
| | VR | 117 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 5037 | 5154 | 5447 | 5730 | 6026 | 6325 | 6687 |
| 40 | V1 | 115 | 115 | 117 | 118 | 119 | 120 | 121 |
| | VR | 118 | 119 | 120 | 121 | 122 | 122 | 123 |
| | V2 | 121 | 121 | 122 | 122 | 123 | 123 | 123 |
| | TOFL | 5561 | 5688 | 6005 | 6325 | 6636 | 6963 | 7362 |
| 45 | V1 | 117 | 118 | 119 | 120 | 121 | 122 | |
| | VR | 120 | 121 | 122 | 122 | 123 | 124 | |
| | V2 | 122 | 122 | 123 | 123 | 123 | 124 | |
| | TOFL | 6182 | 6320 | 6668 | 7020 | 7360 | 7723 | |

TOFL_TO_0_4_06

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps TO/APPR, Ice Protection Off, Altitude 5000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 116 | 118 |
| | V2 | 121 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3402 | 3442 | 3558 | 3764 | 3896 | 4080 | 4308 |
| 5 | V1 | 106 | 106 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 3918 | 3966 | 4087 | 4313 | 4487 | 4699 | 4971 |
| 15 | V1 | 106 | 106 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 4040 | 4090 | 4215 | 4453 | 4630 | 4853 | 5136 |
| 25 | V1 | 109 | 110 | 111 | 113 | 114 | 115 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 4659 | 4720 | 4957 | 5225 | 5500 | 5775 | 6108 |
| 30 | V1 | 111 | 112 | 114 | 115 | 116 | 117 | 119 |
| | VR | 116 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 120 | 120 | 120 | 121 | 122 | 122 | 123 |
| | TOFL | 5032 | 5155 | 5450 | 5735 | 6034 | 6334 | 6698 |
| 35 | V1 | 114 | 114 | 116 | 117 | 118 | 119 | 121 |
| | VR | 118 | 118 | 119 | 120 | 121 | 122 | 123 |
| | V2 | 121 | 121 | 121 | 122 | 122 | 123 | 123 |
| | TOFL | 5542 | 5670 | 5990 | 6311 | 6622 | 6951 | 7349 |
| 40 | V1 | 117 | 117 | 118 | 120 | 121 | 122 | 123 |
| | VR | 120 | 120 | 121 | 122 | 123 | 123 | 124 |
| | V2 | 122 | 122 | 122 | 123 | 123 | 123 | 124 |
| | TOFL | 6145 | 6284 | 6632 | 6984 | 7325 | 7687 | 8128 |
| 45 | V1 | 119 | 120 | 121 | 122 | 123 | | |
| | VR | 122 | 122 | 123 | 124 | 124 | | |
| | V2 | 123 | 123 | 123 | 124 | 124 | | |
| | TOFL | 6857 | 7009 | 7392 | 7780 | 8156 | | |

TOFL_TO_0_5_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude 6000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3549 | 3591 | 3754 | 3942 | 4106 | 4305 | 4547 |
| 0 | V1 | 106 | 107 | 108 | 110 | 110 | 112 | 114 |
| | VR | 113 | 113 | 114 | 115 | 115 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 119 | 120 | 121 |
| | TOFL | 4036 | 4086 | 4249 | 4497 | 4668 | 4900 | 5183 |
| 10 | V1 | 106 | 106 | 108 | 109 | 110 | 112 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 119 | 120 | 121 |
| | TOFL | 4166 | 4218 | 4394 | 4646 | 4829 | 5070 | 5365 |
| 20 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4642 | 4757 | 4957 | 5221 | 5497 | 5774 | 6108 |
| 25 | V1 | 110 | 111 | 113 | 114 | 116 | 117 | 118 |
| | VR | 116 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 5024 | 5137 | 5439 | 5727 | 6027 | 6328 | 6693 |
| 30 | V1 | 113 | 114 | 115 | 117 | 118 | 119 | **120** |
| | VR | 118 | 118 | 119 | 120 | 121 | 122 | **123** |
| | V2 | 120 | 121 | 121 | 122 | 122 | 123 | **123** |
| | TOFL | 5541 | 5669 | 5991 | 6315 | 6629 | 6959 | **7359** |
| 35 | V1 | 116 | 116 | 118 | 119 | **120** | **121** | **122** |
| | VR | 119 | 120 | 121 | 122 | **122** | **123** | **124** |
| | V2 | 121 | 121 | 122 | 122 | **123** | **123** | **124** |
| | TOFL | 6126 | 6266 | 6616 | 6969 | **7311** | **7674** | **8115** |
| 40 | V1 | 118 | 119 | **120** | **121** | **122** | **123** | |
| | VR | 121 | 122 | **122** | **123** | **124** | **124** | |
| | V2 | 122 | 122 | **123** | **123** | **124** | **124** | |
| | TOFL | 6819 | 6972 | **7355** | **7743** | **8119** | **8521** | |

TOFL_TO_0_6_06

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps TO/APPR, Ice Protection Off, Altitude 7000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 116 | 117 | 119 |
| | V2 | 120 | 119 | 120 | 119 | 120 | 121 | 121 |
| | TOFL | 3704 | 3749 | 3973 | 4127 | 4331 | 4544 | 4801 |
| 0 | V1 | 106 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 119 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4227 | 4281 | 4523 | 4718 | 4952 | 5202 | 5504 |
| 10 | V1 | 106 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 119 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4365 | 4421 | 4683 | 4876 | 5127 | 5388 | 5703 |
| 15 | V1 | 108 | 109 | 110 | 111 | 113 | 114 | 116 |
| | VR | 114 | 115 | 115 | 116 | 117 | 118 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4628 | 4755 | 4958 | 5225 | 5503 | 5782 | 6118 |
| 20 | V1 | 110 | 110 | 112 | 114 | 115 | 116 | 118 |
| | VR | 115 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 120 | 121 | 122 | 122 |
| | TOFL | 5010 | 5133 | 5431 | 5720 | 6021 | 6324 | 6690 |
| 25 | V1 | 112 | 113 | 115 | 116 | 117 | 118 | 120 |
| | VR | 117 | 118 | 119 | 120 | 121 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 5529 | 5659 | 5983 | 6308 | 6624 | 6956 | 7357 |
| 30 | V1 | 115 | 116 | 117 | 118 | 119 | 120 | 122 |
| | VR | 119 | 119 | 120 | 121 | 122 | 123 | 124 |
| | V2 | 121 | 121 | 122 | 122 | 123 | 123 | 124 |
| | TOFL | 6117 | 6257 | 6609 | 6963 | 7308 | 7671 | 8114 |
| 35 | V1 | 118 | 118 | 119 | 121 | 122 | 122 | |
| | VR | 121 | 121 | 122 | 123 | 123 | 124 | |
| | V2 | 122 | 122 | 123 | 123 | 123 | 124 | |
| | TOFL | 6782 | 6936 | 7321 | 7709 | 8085 | 8486 | |

TOFL_TO_0_7_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude 8000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 120 | 120 | 120 | 121 | 121 |
| | TOFL | 3867 | 3955 | 4183 | 4353 | 4572 | 4798 | 5070 |
| -10 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 117 | 118 | 119 |
| | V2 | 119 | 118 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4283 | 4368 | 4636 | 4823 | 5071 | 5327 | 5635 |
| 0 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 118 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4432 | 4530 | 4805 | 5004 | 5264 | 5531 | 5852 |
| 10 | V1 | 107 | 108 | 109 | 111 | 112 | 114 | 115 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 119 | 120 | 121 | 121 |
| | TOFL | 4627 | 4739 | 4994 | 5232 | 5509 | 5790 | 6128 |
| 15 | V1 | 109 | 110 | 112 | 113 | 114 | 116 | 117 |
| | VR | 115 | 115 | 116 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 120 | 121 | 121 | 122 |
| | TOFL | 5051 | 5137 | 5439 | 5731 | 6034 | 6339 | 6708 |
| 20 | V1 | 112 | 112 | 114 | 115 | 117 | 118 | 119 |
| | VR | 117 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 5517 | 5647 | 5973 | 6288 | 6618 | 6950 | 7353 |
| 25 | V1 | 114 | 115 | 116 | 118 | 119 | 120 | 121 |
| | VR | 118 | 119 | 120 | 121 | 122 | 122 | 123 |
| | V2 | 121 | 121 | 122 | 122 | 122 | 123 | 123 |
| | TOFL | 6101 | 6243 | 6598 | 6954 | 7300 | 7664 | 8107 |
| 30 | V1 | 117 | 118 | 119 | 120 | 121 | 122 | |
| | VR | 120 | 121 | 122 | 122 | 123 | 124 | |
| | V2 | 122 | 122 | 122 | 123 | 123 | 124 | |
| | TOFL | 6769 | 6923 | 7310 | 7700 | 8079 | 8481 | |

TOFL_TO_0_8_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude 9000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 108 | 109 | 110 | 111 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4080 | 4175 | 4374 | 4590 | 4828 | 5067 | 5356 |
| -10 | V1 | 107 | 108 | 110 | 111 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4535 | 4654 | 4871 | 5120 | 5391 | 5663 | 5992 |
| 0 | V1 | 107 | 108 | 109 | 111 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 119 | 120 | 121 | 121 |
| | TOFL | 4695 | 4821 | 5039 | 5305 | 5588 | 5872 | 6214 |
| 10 | V1 | 109 | 109 | 111 | 112 | 114 | 115 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 5094 | 5164 | 5439 | 5741 | 6047 | 6354 | 6725 |
| 15 | V1 | 111 | 112 | 113 | 115 | 116 | 117 | 119 |
| | VR | 116 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 119 | 120 | 120 | 121 | 121 | 122 | 123 |
| | TOFL | 5520 | 5660 | 5989 | 6307 | 6640 | 6974 | 7380 |
| 20 | V1 | 114 | 114 | 116 | 117 | 118 | 119 | 121 |
| | VR | 118 | 118 | 120 | 120 | 121 | 122 | 123 |
| | V2 | 120 | 121 | 121 | 122 | 122 | 123 | 123 |
| | TOFL | 6092 | 6234 | 6591 | 6949 | 7297 | 7663 | 8108 |
| 25 | V1 | 116 | 117 | 118 | 119 | 120 | 121 | 123 |
| | VR | 120 | 120 | 121 | 122 | 123 | 123 | 124 |
| | V2 | 121 | 122 | 122 | 123 | 123 | 123 | 124 |
| | TOFL | 6755 | 6911 | 7300 | 7691 | 8071 | 8474 | 8965 |
| 30 | V1 | 119 | 119 | 121 | 122 | 123 | | |
| | VR | 122 | 122 | 123 | 123 | 124 | | |
| | V2 | 122 | 123 | 123 | 123 | 124 | | |
| | TOFL | 7517 | 7687 | 8113 | 8543 | 8960 | | |

TOFL_TO_0_9_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off, Altitude 10,000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 109 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 120 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 4329 | 4442 | 4620 | 4862 | 5115 | 5369 | 5676 |
| -15 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4750 | 4868 | 5073 | 5345 | 5628 | 5912 | 6255 |
| -5 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4914 | 5028 | 5251 | 5534 | 5830 | 6126 | 6483 |
| 5 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 5101 | 5207 | 5445 | 5743 | 6051 | 6360 | 6733 |
| 10 | V1 | 110 | 111 | 113 | 114 | 116 | 117 | 118 |
| | VR | 116 | 116 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 119 | 120 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 5550 | 5685 | 6018 | 6339 | 6676 | 7014 | 7422 |
| 15 | V1 | 113 | 114 | 115 | 117 | 118 | 119 | **120** |
| | VR | 118 | 118 | 119 | 120 | 121 | 122 | **123** |
| | V2 | 120 | 120 | 121 | 122 | 122 | 123 | **123** |
| | TOFL | 6102 | 6246 | 6606 | 6967 | 7319 | 7687 | **8134** |
| 20 | V1 | 116 | 116 | 118 | 119 | **120** | **121** | **122** |
| | VR | 119 | 120 | 121 | 122 | **122** | **123** | **124** |
| | V2 | 121 | 121 | 122 | 122 | **123** | **123** | **124** |
| | TOFL | 6744 | 6900 | 7291 | 7684 | **8067** | **8471** | **8963** |
| 25 | V1 | 118 | 119 | **120** | **121** | **122** | **123** | |
| | VR | 121 | 122 | **122** | **123** | **124** | **124** | |
| | V2 | 122 | 122 | **123** | **123** | **124** | **124** | |
| | TOFL | 7520 | 7691 | **8120** | **8553** | **8972** | **9420** | |

TOFL_TO_0_10_06

| Wind Corrected V1 [KIAS] | | |
|---|---|---|
| **FLAPS TO/APPR Ice Protection Off** | | |
| Tailwind | | Headwind |
| 10 | ◄ REF [0] ► | 30 |
| 104 | **105** | 106 |
| 105 | **106** | 107 |
| 106 | **107** | 108 |
| 107 | **108** | 109 |
| 108 | **109** | 110 |
| 109 | **110** | 111 |
| 110 | **111** | 112 |
| 111 | **112** | 113 |
| 112 | **113** | 114 |
| 113 | **114** | 115 |
| 114 | **115** | 116 |
| 115 | **116** | 117 |
| 116 | **117** | 118 |
| 117 | **118** | 119 |
| 118 | **119** | 119 |
| 119 | **120** | 120 |
| 121 | **121** | 121 |
| 122 | **122** | 122 |
| 123 | **123** | 123 |
| 124 | **124** | 124 |

V1WC_TO_0_05

| Slope Corrected V1 [KIAS] | | | | |
|---|---|---|---|---|
| FLAPS TO/APPR, Ice Protection Off | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 103 | 104 | **104** | 105 | 106 |
| 104 | 105 | **105** | 106 | 107 |
| 105 | 106 | **106** | 107 | 108 |
| 106 | 106 | **107** | 108 | 109 |
| 107 | 107 | **108** | 109 | 110 |
| 108 | 108 | **109** | 110 | 111 |
| 109 | 109 | **110** | 111 | 112 |
| 110 | 110 | **111** | 112 | 113 |
| 111 | 111 | **112** | 113 | 114 |
| 111 | 112 | **113** | 114 | 115 |
| 112 | 113 | **114** | 115 | 116 |
| 113 | 114 | **115** | 116 | 116 |
| 114 | 115 | **116** | 117 | 117 |
| 115 | 116 | **117** | 118 | 118 |
| 116 | 117 | **118** | 119 | 119 |
| 117 | 118 | **119** | 120 | 120 |
| 118 | 119 | **120** | 121 | 121 |
| 119 | 120 | **121** | 122 | 122 |
| 120 | 121 | **122** | 123 | 123 |
| 121 | 122 | **123** | 124 | 124 |
| 122 | 123 | **124** | 125 | 125 |
| 123 | 124 | **125** | 126 | 126 |

V1SC_TO_0_05

## Takeoff Rotation Speed ($V_R$) Slope Correction, Ice Protection Off

**NOTE** $V_R$ with flaps TO/APPR and Ice Protection Off does not require slope correction.

| Slope Corrected V2 [KIAS] | | | | |
|---|---|---|---|---|
| FLAPS TO/APPR, Ice Protection Off | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 120 | 119 | **118** | 117 | 116 |
| 121 | 120 | **119** | 118 | 117 |
| 122 | 121 | **120** | 119 | 118 |
| 123 | 122 | **121** | 120 | 119 |
| 124 | 123 | **122** | 121 | 120 |
| 125 | 124 | **123** | 122 | 121 |
| 126 | 125 | **124** | 123 | 122 |

V2SC_TO_0_05

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS TO/APPR, Ice Protection Off | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 3181 | **2600** | 2437 | 2295 | 2155 |
| 3291 | **2700** | 2533 | 2388 | 2244 |
| 3400 | **2800** | 2630 | 2481 | 2333 |
| 3510 | **2900** | 2726 | 2573 | 2423 |
| 3619 | **3000** | 2823 | 2666 | 2512 |
| 3729 | **3100** | 2919 | 2759 | 2601 |
| 3838 | **3200** | 3016 | 2852 | 2691 |
| 3947 | **3300** | 3112 | 2944 | 2780 |
| 4057 | **3400** | 3209 | 3037 | 2869 |
| 4166 | **3500** | 3306 | 3130 | 2959 |
| 4276 | **3600** | 3402 | 3222 | 3048 |
| 4385 | **3700** | 3499 | 3315 | 3137 |
| 4495 | **3800** | 3595 | 3408 | 3227 |
| 4604 | **3900** | 3692 | 3500 | 3316 |
| 4714 | **4000** | 3788 | 3593 | 3405 |
| 4823 | **4100** | 3885 | 3686 | 3494 |
| 4933 | **4200** | 3981 | 3778 | 3584 |
| 5042 | **4300** | 4078 | 3871 | 3673 |
| 5151 | **4400** | 4174 | 3964 | 3762 |
| 5261 | **4500** | 4271 | 4056 | 3852 |
| 5370 | **4600** | 4367 | 4149 | 3941 |
| 5480 | **4700** | 4464 | 4242 | 4030 |
| 5589 | **4800** | 4560 | 4334 | 4120 |
| 5699 | **4900** | 4657 | 4427 | 4209 |
| 5808 | **5000** | 4753 | 4520 | 4298 |
| 5918 | **5100** | 4850 | 4613 | 4388 |
| 6027 | **5200** | 4946 | 4705 | 4477 |
| 6137 | **5300** | 5043 | 4798 | 4566 |
| 6246 | **5400** | 5139 | 4891 | 4656 |
| 6356 | **5500** | 5236 | 4983 | 4745 |
| 6465 | **5600** | 5332 | 5076 | 4834 |
| 6574 | **5700** | 5429 | 5169 | 4924 |
| 6684 | **5800** | 5525 | 5261 | 5013 |
| 6793 | **5900** | 5622 | 5354 | 5102 |
| 6903 | **6000** | 5718 | 5447 | 5192 |
| 7012 | **6100** | 5815 | 5539 | 5281 |

TOWC1_TO_0_02

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | **◄ REF [0] ►** | 10 | 20 | 30 |
| 7012 | **6100** | 5815 | 5539 | 5281 |
| 7122 | **6200** | 5911 | 5632 | 5370 |
| 7231 | **6300** | 6008 | 5725 | 5460 |
| 7341 | **6400** | 6104 | 5817 | 5549 |
| 7450 | **6500** | 6201 | 5910 | 5638 |
| 7560 | **6600** | 6297 | 6003 | 5728 |
| 7669 | **6700** | 6394 | 6096 | 5817 |
| 7779 | **6800** | 6491 | 6188 | 5906 |
| 7888 | **6900** | 6587 | 6281 | 5995 |
| 7997 | **7000** | 6684 | 6374 | 6085 |
| 8107 | **7100** | 6780 | 6466 | 6174 |
| 8216 | **7200** | 6877 | 6559 | 6263 |
| 8326 | **7300** | 6973 | 6652 | 6353 |
| 8435 | **7400** | 7070 | 6744 | 6442 |
| 8545 | **7500** | 7166 | 6837 | 6531 |
| 8654 | **7600** | 7263 | 6930 | 6621 |
| 8764 | **7700** | 7359 | 7022 | 6710 |
| 8873 | **7800** | 7456 | 7115 | 6799 |
| 8983 | **7900** | 7552 | 7208 | 6889 |
| 9092 | **8000** | 7649 | 7300 | 6978 |
| 9202 | **8100** | 7745 | 7393 | 7067 |
| 9311 | **8200** | 7842 | 7486 | 7157 |
| 9420 | **8300** | 7938 | 7578 | 7246 |
| 9530 | **8400** | 8035 | 7671 | 7335 |
| 9639 | **8500** | 8131 | 7764 | 7425 |
| 9749 | **8600** | 8228 | 7857 | 7514 |
| 9858 | **8700** | 8324 | 7949 | 7603 |
| 9968 | **8800** | 8421 | 8042 | 7693 |
| 10077 | **8900** | 8517 | 8135 | 7782 |
| 10187 | **9000** | 8614 | 8227 | 7871 |
| 10296 | **9100** | 8710 | 8320 | 7961 |
| 10406 | **9200** | 8807 | 8413 | 8050 |
| 10515 | **9300** | 8903 | 8505 | 8139 |
| 10624 | **9400** | 9000 | 8598 | 8228 |

TOWC2_TO_0_02

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 2361 | 2222 | **2100** | 2072 | 2064 |
| 2450 | 2316 | **2200** | 2176 | 2173 |
| 2538 | 2411 | **2300** | 2281 | 2283 |
| 2627 | 2505 | **2400** | 2385 | 2392 |
| 2716 | 2599 | **2500** | 2489 | 2502 |
| 2805 | 2693 | **2600** | 2593 | 2612 |
| 2894 | 2787 | **2700** | 2697 | 2721 |
| 2982 | 2882 | **2800** | 2802 | 2831 |
| 3071 | 2976 | **2900** | 2906 | 2940 |
| 3160 | 3070 | **3000** | 3010 | 3050 |
| 3249 | 3164 | **3100** | 3114 | 3160 |
| 3338 | 3258 | **3200** | 3218 | 3269 |
| 3426 | 3353 | **3300** | 3323 | 3379 |
| 3515 | 3447 | **3400** | 3427 | 3488 |
| 3604 | 3541 | **3500** | 3531 | 3598 |
| 3693 | 3635 | **3600** | 3635 | 3708 |
| 3782 | 3729 | **3700** | 3739 | 3817 |
| 3870 | 3824 | **3800** | 3844 | 3927 |
| 3959 | 3918 | **3900** | 3948 | 4036 |
| 4048 | 4012 | **4000** | 4052 | 4146 |
| 4137 | 4106 | **4100** | 4156 | 4256 |
| 4226 | 4200 | **4200** | 4260 | 4365 |
| 4314 | 4295 | **4300** | 4365 | 4475 |
| 4403 | 4389 | **4400** | 4469 | 4584 |
| 4492 | 4483 | **4500** | 4573 | 4694 |
| 4581 | 4577 | **4600** | 4677 | 4804 |
| 4670 | 4671 | **4700** | 4781 | 4913 |
| 4758 | 4766 | **4800** | 4886 | 5023 |
| 4847 | 4860 | **4900** | 4990 | 5132 |
| 4936 | 4954 | **5000** | 5094 | 5242 |
| 5025 | 5048 | **5100** | 5198 | 5352 |
| 5114 | 5142 | **5200** | 5302 | 5461 |
| 5202 | 5237 | **5300** | 5407 | 5571 |
| 5291 | 5331 | **5400** | 5511 | 5680 |
| 5380 | 5425 | **5500** | 5615 | 5790 |
| 5469 | 5519 | **5600** | 5719 | 5900 |

TOSC1_TO_0_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 5469 | 5519 | **5600** | 5719 | 5900 |
| 5558 | 5613 | **5700** | 5823 | 6009 |
| 5646 | 5708 | **5800** | 5928 | 6119 |
| 5735 | 5802 | **5900** | 6032 | 6228 |
| 5824 | 5896 | **6000** | 6136 | 6338 |
| 5913 | 5990 | **6100** | 6240 | 6448 |
| 6002 | 6084 | **6200** | 6344 | 6557 |
| 6090 | 6179 | **6300** | 6449 | 6667 |
| 6179 | 6273 | **6400** | 6553 | 6776 |
| 6268 | 6367 | **6500** | 6657 | 6886 |
| 6357 | 6461 | **6600** | 6761 | 6996 |
| 6446 | 6555 | **6700** | 6865 | 7105 |
| 6534 | 6650 | **6800** | 6970 | 7215 |
| 6623 | 6744 | **6900** | 7074 | 7324 |
| 6712 | 6838 | **7000** | 7178 | 7434 |
| 6801 | 6932 | **7100** | 7282 | 7544 |
| 6890 | 7026 | **7200** | 7386 | 7653 |
| 6978 | 7121 | **7300** | 7491 | 7763 |
| 7067 | 7215 | **7400** | 7595 | 7872 |
| 7156 | 7309 | **7500** | 7699 | 7982 |
| 7245 | 7403 | **7600** | 7803 | 8092 |
| 7334 | 7497 | **7700** | 7907 | 8201 |
| 7422 | 7592 | **7800** | 8012 | 8311 |
| 7511 | 7686 | **7900** | 8116 | 8420 |
| 7600 | 7780 | **8000** | 8220 | 8530 |
| 7689 | 7874 | **8100** | 8324 | 8640 |
| 7778 | 7968 | **8200** | 8428 | 8749 |
| 7866 | 8063 | **8300** | 8533 | 8859 |
| 7955 | 8157 | **8400** | 8637 | 8968 |
| 8044 | 8251 | **8500** | 8741 | 9078 |
| 8133 | 8345 | **8600** | 8845 | 9188 |
| 8222 | 8439 | **8700** | 8949 | 9297 |
| 8310 | 8534 | **8800** | 9054 | 9407 |
| 8399 | 8628 | **8900** | 9158 | 9516 |
| 8488 | 8722 | **9000** | 9262 | 9626 |
| 8577 | 8816 | **9100** | 9366 | 9736 |

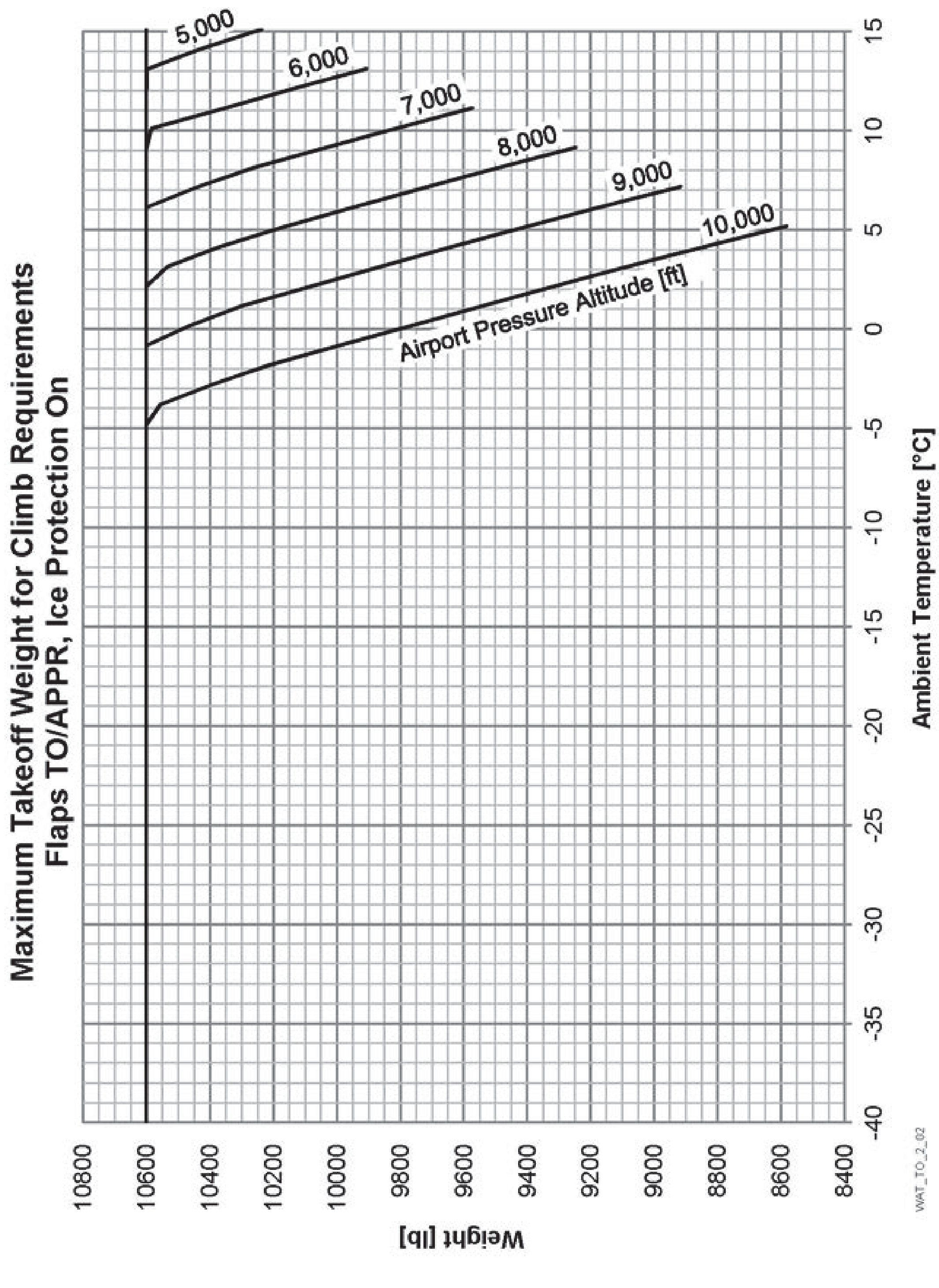
TOSC2_TO_0_03

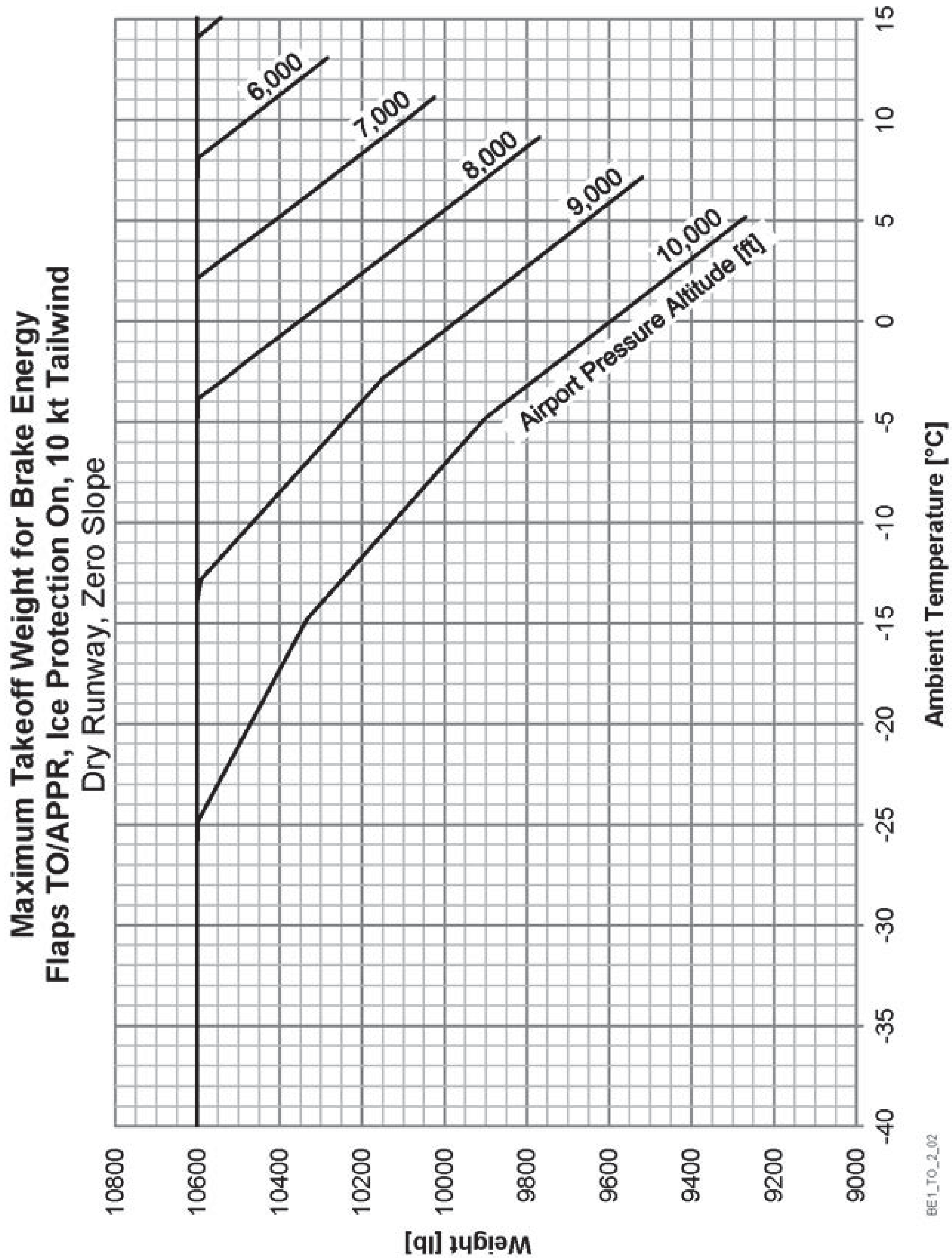
| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | **◄ REF [0] ►** | 1 | 2 |
| 8577 | 8816 | **9100** | 9366 | 9736 |
| 8666 | 8910 | **9200** | 9470 | 9845 |
| 8754 | 9005 | **9300** | 9575 | 9955 |
| 8843 | 9099 | **9400** | 9679 | 10064 |
| 8932 | 9193 | **9500** | 9783 | 10174 |
| 9021 | 9287 | **9600** | 9887 | 10284 |
| 9110 | 9381 | **9700** | 9991 | 10393 |
| 9198 | 9476 | **9800** | 10096 | 10503 |
| 9287 | 9570 | **9900** | 10200 | 10612 |
| 9376 | 9664 | **10000** | 10304 | 10722 |
| 9465 | 9758 | **10100** | 10408 | 10832 |
| 9554 | 9852 | **10200** | 10512 | 10941 |
| 9642 | 9947 | **10300** | 10617 | 11051 |
| 9731 | 10041 | **10400** | 10721 | 11160 |
| 9820 | 10135 | **10500** | 10825 | 11270 |
| 9909 | 10229 | **10600** | 10929 | 11380 |
| 9998 | 10323 | **10700** | 11033 | 11489 |

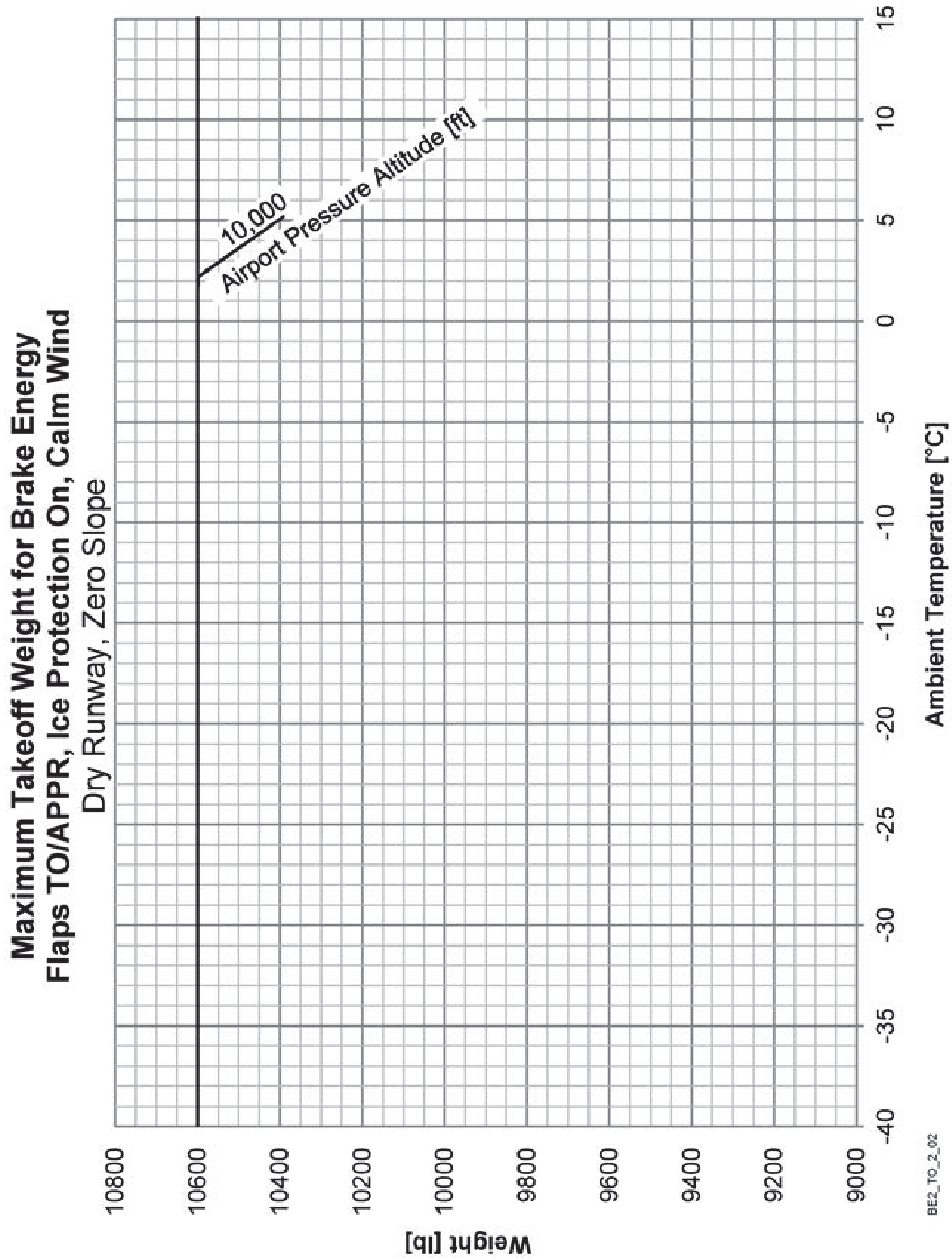
TOSC3_TO_0_03

# Honda Aircraft Company






Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection On, 10 kt Tailwind
Dry Runway, Zero Slope
6,000
7,000
8,000
9,000
10,000
Airport Pressure Altitude [ft]
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Ambient Temperature [°C]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
Weight [lb]
BE1_TO_2_02


Maximum Takeoff Weight for Brake Energy
Flaps TO/APPR, Ice Protection On, Calm Wind
Dry Runway, Zero Slope
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
BE2_TO_2_02

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection On, Altitude -1000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 107 | 107 | 108 | 108 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 124 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2700 | 2729 | 2799 | 2870 | 2941 | 3081 | 3205 |
| -30 | V1 | 106 | 107 | 107 | 108 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 124 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2789 | 2819 | 2893 | 2967 | 3042 | 3186 | 3318 |
| -20 | V1 | 106 | 107 | 107 | 108 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2876 | 2907 | 2985 | 3062 | 3140 | 3287 | 3429 |
| -10 | V1 | 106 | 106 | 107 | 108 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2965 | 2998 | 3079 | 3160 | 3241 | 3389 | 3541 |
| -5 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 3008 | 3041 | 3124 | 3206 | 3289 | 3434 | 3594 |
| 0 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 3050 | 3084 | 3168 | 3252 | 3337 | 3480 | 3647 |
| 5 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 121 | 120 | 119 | 120 |
| | TOFL | 3097 | 3127 | 3213 | 3299 | 3385 | 3526 | 3700 |
| 10 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 121 | 120 | 119 | 120 |
| | TOFL | 3143 | 3170 | 3258 | 3345 | 3433 | 3572 | 3754 |

TOFL_TO_2_-1_02

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection On, Altitude Sea Level**

| Temp. [°C] | Data | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| -40 | V1 | 107 | 107 | 107 | 108 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2782 | 2811 | 2885 | 2959 | 3034 | 3186 | 3318 |
| -30 | V1 | 106 | 107 | 107 | 108 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2877 | 2908 | 2985 | 3062 | 3140 | 3296 | 3435 |
| -20 | V1 | 106 | 106 | 107 | 108 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 123 | 122 | 121 | 120 | 120 | 120 |
| | TOFL | 2964 | 2996 | 3078 | 3158 | 3240 | 3398 | 3540 |
| -10 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 121 | 120 | 120 | 120 |
| | TOFL | 3055 | 3089 | 3174 | 3258 | 3343 | 3500 | 3655 |
| -5 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 3100 | 3134 | 3220 | 3306 | 3393 | 3548 | 3710 |
| 0 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 3144 | 3179 | 3267 | 3354 | 3442 | 3595 | 3765 |
| 5 | V1 | 106 | 106 | 107 | 107 | 108 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 119 | 120 |
| | TOFL | 3193 | 3224 | 3313 | 3403 | 3492 | 3644 | 3821 |
| 10 | V1 | 106 | 106 | 106 | 107 | 108 | 109 | 110 |
| | VR | 113 | 113 | 113 | 113 | 113 | 114 | 115 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 119 | 120 |
| | TOFL | 3239 | 3268 | 3360 | 3451 | 3542 | 3694 | 3876 |

TOFL_TO_2_0_02

# Honda Aircraft Company



| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 1000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 109 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 123 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 2892 | 2923 | 3002 | 3081 | 3195 | 3352 | 3491 |
| -30 | V1 | 106 | 107 | 107 | 108 | 109 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 123 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 2990 | 3023 | 3105 | 3187 | 3302 | 3470 | 3611 |
| -20 | V1 | 106 | 107 | 107 | 108 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 116 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3083 | 3117 | 3203 | 3289 | 3403 | 3582 | 3726 |
| -10 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3177 | 3213 | 3302 | 3391 | 3502 | 3687 | 3839 |
| -5 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3223 | 3260 | 3351 | 3442 | 3551 | 3739 | 3895 |
| 0 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3269 | 3307 | 3400 | 3493 | 3600 | 3791 | 3950 |
| 5 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 113 | 115 | 115 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3316 | 3354 | 3449 | 3543 | 3650 | 3843 | 4007 |
| 10 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3381 | 3419 | 3515 | 3611 | 3770 | 3939 | 4128 |

TOFL_TO_2_1_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 2000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 3007 | 3040 | 3124 | 3207 | 3362 | 3494 | 3671 |
| -30 | V1 | 106 | 107 | 107 | 108 | 109 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 122 | 121 | 120 | 120 | 120 | 120 |
| | TOFL | 3107 | 3142 | 3229 | 3317 | 3470 | 3616 | 3795 |
| -20 | V1 | 106 | 107 | 107 | 108 | 109 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 122 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3205 | 3241 | 3332 | 3423 | 3575 | 3735 | 3914 |
| -10 | V1 | 106 | 106 | 107 | 108 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 121 | 120 | 119 | 120 | 120 |
| | TOFL | 3303 | 3341 | 3436 | 3530 | 3680 | 3853 | 4033 |
| -5 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 120 | 119 | 120 | 120 |
| | TOFL | 3353 | 3391 | 3488 | 3584 | 3733 | 3913 | 4093 |
| 0 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 120 | 119 | 120 | 120 |
| | TOFL | 3401 | 3441 | 3539 | 3638 | 3786 | 3972 | 4153 |
| 5 | V1 | 106 | 106 | 107 | 107 | 108 | 110 | 111 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 120 | 119 | 120 | 120 |
| | TOFL | 3451 | 3491 | 3591 | 3692 | 3840 | 4032 | 4214 |
| 10 | V1 | 106 | 107 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 120 | 119 | 119 | 120 | 120 | 120 |
| | TOFL | 3538 | 3579 | 3679 | 3845 | 4021 | 4183 | 4415 |

TOFL_TO_2_2_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 3000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 117 |
| | V2 | 122 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3130 | 3165 | 3254 | 3365 | 3546 | 3666 | 3865 |
| -30 | V1 | 106 | 107 | 107 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 116 |
| | V2 | 122 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3240 | 3276 | 3368 | 3476 | 3663 | 3790 | 3998 |
| -20 | V1 | 106 | 107 | 107 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3334 | 3373 | 3469 | 3572 | 3766 | 3895 | 4116 |
| -10 | V1 | 106 | 106 | 107 | 108 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3438 | 3478 | 3579 | 3679 | 3878 | 4021 | 4245 |
| -5 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3490 | 3531 | 3633 | 3736 | 3936 | 4083 | 4309 |
| 0 | V1 | 106 | 106 | 107 | 107 | 109 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 114 | 115 | 116 |
| | V2 | 121 | 121 | 120 | 119 | 119 | 120 | 120 |
| | TOFL | 3542 | 3584 | 3688 | 3793 | 3994 | 4147 | 4375 |
| 5 | V1 | 106 | 106 | 107 | 108 | 110 | 110 | 112 |
| | VR | 113 | 113 | 113 | 113 | 115 | 115 | 117 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 119 | 120 |
| | TOFL | 3604 | 3646 | 3752 | 3878 | 4093 | 4237 | 4475 |
| 10 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 3715 | 3758 | 3938 | 4116 | 4296 | 4501 | 4748 |

TOFL_TO_2_3_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 4000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 109 | 111 | 112 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 121 | 120 | 120 | 120 | 120 | 121 |
| | TOFL | 3262 | 3299 | 3393 | 3549 | 3710 | 3861 | 4077 |
| -30 | V1 | 107 | 107 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3371 | 3410 | 3508 | 3660 | 3838 | 3987 | 4211 |
| -20 | V1 | 106 | 107 | 107 | 108 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3475 | 3516 | 3618 | 3768 | 3961 | 4110 | 4342 |
| -10 | V1 | 106 | 106 | 107 | 108 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 121 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3585 | 3628 | 3734 | 3884 | 4090 | 4240 | 4481 |
| -5 | V1 | 106 | 106 | 107 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 114 | 115 | 115 | 117 |
| | V2 | 121 | 120 | 120 | 119 | 120 | 120 | 120 |
| | TOFL | 3640 | 3683 | 3792 | 3941 | 4155 | 4305 | 4550 |
| 0 | V1 | 106 | 106 | 107 | 108 | 110 | 111 | 112 |
| | VR | 113 | 113 | 113 | 114 | 115 | 115 | 117 |
| | V2 | 121 | 120 | 120 | 119 | 120 | 119 | 120 |
| | TOFL | 3695 | 3739 | 3850 | 4000 | 4219 | 4371 | 4620 |
| 5 | V1 | 106 | 107 | 108 | 110 | 110 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 116 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 119 | 120 | 121 |
| | TOFL | 3779 | 3824 | 3959 | 4193 | 4338 | 4545 | 4801 |
| 10 | V1 | 108 | 109 | 110 | 112 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 3967 | 4065 | 4228 | 4436 | 4655 | 4874 | 5138 |

TOFL_TO_2_4_02

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection On, Altitude 5000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 116 | 118 |
| | V2 | 121 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3399 | 3439 | 3541 | 3752 | 3886 | 4069 | 4297 |
| -30 | V1 | 107 | 107 | 107 | 109 | 110 | 112 | 113 |
| | VR | 113 | 113 | 113 | 115 | 115 | 116 | 117 |
| | V2 | 121 | 120 | 119 | 120 | 119 | 120 | 121 |
| | TOFL | 3518 | 3560 | 3663 | 3875 | 4017 | 4208 | 4445 |
| -20 | V1 | 106 | 107 | 107 | 109 | 110 | 112 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 121 | 120 | 119 | 119 | 119 | 120 | 121 |
| | TOFL | 3623 | 3667 | 3775 | 3986 | 4138 | 4334 | 4581 |
| -10 | V1 | 106 | 107 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 3739 | 3784 | 3897 | 4108 | 4275 | 4473 | 4729 |
| -5 | V1 | 106 | 106 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 3797 | 3843 | 3959 | 4172 | 4343 | 4544 | 4805 |
| 0 | V1 | 106 | 106 | 107 | 109 | 110 | 111 | 113 |
| | VR | 113 | 113 | 113 | 114 | 115 | 116 | 117 |
| | V2 | 120 | 120 | 119 | 119 | 119 | 120 | 120 |
| | TOFL | 3856 | 3903 | 4020 | 4235 | 4412 | 4615 | 4881 |
| 5 | V1 | 107 | 108 | 110 | 111 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 120 | 119 | 120 | 121 | 121 |
| | TOFL | 3969 | 4047 | 4283 | 4447 | 4665 | 4890 | 5161 |
| 10 | V1 | 110 | 110 | 112 | 113 | 115 | 116 | 118 |
| | VR | 115 | 115 | 116 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 120 | 121 | 122 | 122 |
| | TOFL | 4298 | 4370 | 4595 | 4830 | 5065 | 5299 | 5583 |

TOFL_TO_2_5_02

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection On, Altitude 6000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 108 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3545 | 3587 | 3741 | 3937 | 4094 | 4292 | 4534 |
| -30 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 120 | 120 | 121 |
| | TOFL | 3666 | 3710 | 3861 | 4074 | 4230 | 4436 | 4687 |
| -20 | V1 | 107 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 119 | 120 | 121 |
| | TOFL | 3781 | 3827 | 3977 | 4207 | 4363 | 4576 | 4837 |
| -10 | V1 | 106 | 107 | 108 | 110 | 111 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 119 | 120 | 121 |
| | TOFL | 3904 | 3952 | 4103 | 4343 | 4505 | 4727 | 4999 |
| -5 | V1 | 106 | 107 | 108 | 110 | 110 | 112 | 114 |
| | VR | 113 | 113 | 113 | 115 | 115 | 117 | 118 |
| | V2 | 120 | 120 | 119 | 120 | 119 | 120 | 121 |
| | TOFL | 3967 | 4016 | 4169 | 4414 | 4580 | 4806 | 5083 |
| 0 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 119 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4054 | 4104 | 4334 | 4514 | 4735 | 4970 | 5253 |
| 5 | V1 | 109 | 110 | 111 | 112 | 114 | 115 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 4339 | 4408 | 4603 | 4838 | 5079 | 5321 | 5612 |
| 10 | V1 | 112 | 112 | 114 | 115 | 117 | 118 | 119 |
| | VR | 116 | 117 | 118 | 119 | 120 | 121 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 4699 | 4800 | 5054 | 5299 | 5555 | 5811 | 6120 |

TOFL_TO_2_6_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flaps TO/APPR, Ice Protection On, Altitude 7000 feet | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 3702 | 3747 | 3958 | 4117 | 4318 | 4531 | 4787 |
| -30 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 3832 | 3878 | 4088 | 4264 | 4466 | 4687 | 4954 |
| -20 | V1 | 107 | 107 | 109 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 120 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 3952 | 4001 | 4205 | 4404 | 4608 | 4839 | 5116 |
| -10 | V1 | 107 | 107 | 108 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 119 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4085 | 4136 | 4347 | 4555 | 4768 | 5008 | 5297 |
| -5 | V1 | 106 | 107 | 108 | 110 | 111 | 113 | 114 |
| | VR | 113 | 113 | 114 | 115 | 116 | 117 | 118 |
| | V2 | 119 | 119 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4155 | 4207 | 4434 | 4635 | 4855 | 5100 | 5396 |
| 0 | V1 | 108 | 109 | 110 | 112 | 113 | 114 | 116 |
| | VR | 114 | 115 | 115 | 116 | 117 | 118 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4338 | 4454 | 4634 | 4874 | 5124 | 5373 | 5675 |
| 5 | V1 | 111 | 111 | 113 | 114 | 116 | 117 | 118 |
| | VR | 116 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 120 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 4670 | 4768 | 5031 | 5280 | 5539 | 5798 | 6112 |
| 10 | V1 | 114 | 114 | 116 | 117 | 118 | **120** | **121** |
| | VR | 118 | 118 | 119 | 120 | 121 | **122** | **123** |
| | V2 | 121 | 121 | 121 | 122 | 122 | **123** | **123** |
| | TOFL | 5180 | 5290 | 5566 | 5831 | 6110 | **6389** | **6729** |

TOFL_TO_2_7_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 8000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 113 | 115 | 115 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 120 | 120 | 120 | 121 | 121 |
| | TOFL | 3865 | 3943 | 4177 | 4342 | 4560 | 4785 | 5056 |
| -30 | V1 | 107 | 107 | 110 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 116 | 118 | 119 |
| | V2 | 119 | 119 | 120 | 119 | 120 | 121 | 121 |
| | TOFL | 4000 | 4072 | 4327 | 4490 | 4716 | 4951 | 5234 |
| -20 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 116 | 118 | 119 |
| | V2 | 119 | 118 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4134 | 4207 | 4473 | 4644 | 4881 | 5126 | 5421 |
| -10 | V1 | 107 | 107 | 109 | 110 | 112 | 113 | 115 |
| | VR | 113 | 113 | 115 | 115 | 117 | 118 | 119 |
| | V2 | 119 | 118 | 119 | 119 | 120 | 120 | 121 |
| | TOFL | 4279 | 4359 | 4636 | 4815 | 5063 | 5318 | 5626 |
| -5 | V1 | 107 | 108 | 110 | 111 | 112 | 114 | 115 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 119 | 120 | 121 | 121 |
| | TOFL | 4369 | 4482 | 4730 | 4942 | 5199 | 5460 | 5775 |
| 0 | V1 | 110 | 110 | 112 | 113 | 115 | 116 | 118 |
| | VR | 115 | 115 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 120 | 121 | 122 | 122 |
| | TOFL | 4684 | 4778 | 5043 | 5299 | 5566 | 5833 | 6155 |
| 5 | V1 | 113 | 113 | 115 | 116 | 118 | 119 | 120 |
| | VR | 117 | 118 | 119 | 120 | 121 | 122 | 122 |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | 123 |
| | TOFL | 5126 | 5237 | 5515 | 5782 | 6062 | 6343 | 6683 |
| 10 | V1 | 116 | 117 | 118 | 119 | 120 | 121 | 122 |
| | VR | 120 | 120 | 121 | 122 | 122 | 123 | 124 |
| | V2 | 121 | 122 | 122 | 123 | 123 | 123 | 124 |
| | TOFL | 5719 | 5839 | 6138 | 6439 | 6731 | 7038 | 7412 |

TOFL_TO_2_8_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 9000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 108 | 108 | 110 | 111 | 113 | 114 | 116 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4068 | 4164 | 4371 | 4580 | 4816 | 5055 | 5343 |
| -30 | V1 | 107 | 108 | 110 | 111 | 113 | 114 | 115 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4210 | 4310 | 4532 | 4746 | 4992 | 5241 | 5542 |
| -20 | V1 | 107 | 108 | 110 | 111 | 113 | 114 | 116 |
| | VR | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4361 | 4465 | 4693 | 4921 | 5179 | 5440 | 5754 |
| -10 | V1 | 107 | 108 | 110 | 111 | 113 | 114 | 116 |
| | VR | 114 | 114 | 115 | 116 | 117 | 118 | 119 |
| | V2 | 118 | 119 | 119 | 120 | 120 | 121 | 121 |
| | TOFL | 4528 | 4646 | 4866 | 5113 | 5384 | 5656 | 5985 |
| -5 | V1 | 109 | 109 | 111 | 113 | 114 | 115 | 117 |
| | VR | 115 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 121 | 121 | 122 |
| | TOFL | 4768 | 4837 | 5081 | 5355 | 5632 | 5909 | 6244 |
| 0 | V1 | 112 | 112 | 114 | 115 | 117 | 118 | **119** |
| | VR | 116 | 117 | 118 | 119 | 120 | 121 | **122** |
| | V2 | 120 | 120 | 121 | 121 | 122 | 122 | **123** |
| | TOFL | 5110 | 5223 | 5507 | 5781 | 6067 | 6354 | **6700** |
| 5 | V1 | 115 | 116 | 117 | 118 | **119** | **120** | **122** |
| | VR | 119 | 119 | 120 | 121 | **122** | **123** | **124** |
| | V2 | 121 | 121 | 122 | 122 | **123** | **123** | **124** |
| | TOFL | 5656 | 5777 | 6079 | 6381 | **6673** | **6981** | **7354** |
| 10 | V1 | 118 | 119 | **120** | **121** | **122** | **123** | |
| | VR | 121 | 121 | **122** | **123** | **124** | **124** | |
| | V2 | 122 | 122 | **123** | **123** | **124** | **124** | |
| | TOFL | 6324 | 6454 | **6780** | **7109** | **7427** | **7764** | |

TOFL_TO_2_9_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection On, Altitude 10,000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 116 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4314 | 4434 | 4612 | 4855 | 5108 | 5362 | 5669 |
| -30 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 116 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4474 | 4600 | 4787 | 5040 | 5305 | 5570 | 5890 |
| -20 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 115 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4653 | 4775 | 4971 | 5236 | 5513 | 5791 | 6126 |
| -10 | V1 | 108 | 109 | 110 | 112 | 113 | 115 | 116 |
| | VR | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| | V2 | 119 | 119 | 119 | 120 | 120 | 121 | 122 |
| | TOFL | 4832 | 4943 | 5161 | 5440 | 5729 | 6020 | 6370 |
| -5 | V1 | 110 | 111 | 113 | 114 | 116 | 117 | 118 |
| | VR | 116 | 116 | 117 | 118 | 119 | 120 | 121 |
| | V2 | 119 | 119 | 120 | 121 | 121 | 122 | 122 |
| | TOFL | 5107 | 5215 | 5515 | 5797 | 6091 | 6385 | 6741 |
| 0 | V1 | 114 | 114 | 116 | 117 | 118 | **119** | **121** |
| | VR | 118 | 118 | 120 | 120 | 121 | **122** | **123** |
| | V2 | 121 | 121 | 121 | 122 | 122 | **123** | **123** |
| | TOFL | 5596 | 5718 | 6021 | 6312 | 6619 | **6927** | **7300** |
| 5 | V1 | 117 | 118 | 119 | **120** | **121** | **122** | |
| | VR | 120 | 121 | 122 | **122** | **123** | **124** | |
| | V2 | 122 | 122 | 122 | **123** | **123** | **124** | |
| | TOFL | 6264 | 6395 | 6723 | **7053** | **7373** | **7711** | |
| 10 | V1 | **120** | **121** | **122** | **123** | | | |
| | VR | **122** | **123** | **123** | **124** | | | |
| | V2 | **123** | **123** | **123** | **124** | | | |
| | TOFL | **7018** | **7160** | **7516** | **7875** | | | |

TOFL_TO_2_10_03

| Wind Corrected V1 [KIAS] | | |
|---|---|---|
| FLAPS TO/APPR<br>Ice Protection On | | |
| Tailwind | | Headwind |
| 10 | ◄ REF [0] ► | 30 |
| 104 | **105** | 107 |
| 105 | **106** | 108 |
| 106 | **107** | 109 |
| 107 | **108** | 109 |
| 108 | **109** | 110 |
| 109 | **110** | 111 |
| 110 | **111** | 112 |
| 111 | **112** | 113 |
| 112 | **113** | 114 |
| 113 | **114** | 115 |
| 114 | **115** | 116 |
| 115 | **116** | 117 |
| 116 | **117** | 118 |
| 117 | **118** | 119 |
| 118 | **119** | 120 |
| 119 | **120** | 121 |
| 120 | **121** | 121 |
| 121 | **122** | 122 |
| 122 | **123** | 123 |
| 123 | **124** | 124 |

V1WC_TO_2_03

| Slope Corrected V1 [KIAS] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 103 | 104 | **104** | 105 | 106 |
| 104 | 105 | **105** | 106 | 107 |
| 105 | 106 | **106** | 107 | 108 |
| 106 | 106 | **107** | 108 | 109 |
| 107 | 107 | **108** | 109 | 110 |
| 108 | 108 | **109** | 110 | 111 |
| 109 | 109 | **110** | 111 | 112 |
| 110 | 110 | **111** | 112 | 113 |
| 111 | 111 | **112** | 113 | 114 |
| 112 | 112 | **113** | 114 | 115 |
| 112 | 113 | **114** | 115 | 115 |
| 113 | 114 | **115** | 116 | 116 |
| 114 | 115 | **116** | 117 | 117 |
| 115 | 116 | **117** | 118 | 118 |
| 116 | 117 | **118** | 119 | 119 |
| 117 | 118 | **119** | 120 | 120 |
| 118 | 119 | **120** | 121 | 121 |
| 119 | 120 | **121** | 122 | 122 |
| 120 | 121 | **122** | 123 | 123 |
| 121 | 122 | **123** | 124 | 124 |
| 122 | 123 | **124** | 125 | 125 |

V1SC_TO_2_05

## Takeoff Rotation Speed ($V_R$) Slope Correction, Ice Protection On

**NOTE** $V_R$ with flaps TO/APPR and Ice Protection On does not require slope correction.

| Slope Corrected V2 [KIAS] | | | | |
|---|---|---|---|---|
| FLAPS TO/APPR, Ice Protection On | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 120 | 119 | **118** | 117 | 116 |
| 121 | 120 | **119** | 118 | 117 |
| 122 | 121 | **120** | 119 | 118 |
| 123 | 122 | **121** | 120 | 119 |
| 124 | 123 | **122** | 121 | 120 |
| 125 | 124 | **123** | 122 | 121 |
| 126 | 125 | **124** | 123 | 122 |

V2SC_TO_2_06

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS TO/APPR, Ice Protection On | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 3180 | **2600** | 2447 | 2293 | 2159 |
| 3289 | **2700** | 2543 | 2385 | 2248 |
| 3399 | **2800** | 2640 | 2478 | 2337 |
| 3509 | **2900** | 2736 | 2570 | 2426 |
| 3618 | **3000** | 2833 | 2663 | 2515 |
| 3728 | **3100** | 2929 | 2755 | 2603 |
| 3837 | **3200** | 3026 | 2848 | 2692 |
| 3947 | **3300** | 3122 | 2940 | 2781 |
| 4057 | **3400** | 3219 | 3033 | 2870 |
| 4166 | **3500** | 3315 | 3125 | 2959 |
| 4276 | **3600** | 3412 | 3218 | 3048 |
| 4386 | **3700** | 3509 | 3311 | 3137 |
| 4495 | **3800** | 3605 | 3403 | 3226 |
| 4605 | **3900** | 3702 | 3496 | 3315 |
| 4715 | **4000** | 3798 | 3588 | 3404 |
| 4824 | **4100** | 3895 | 3681 | 3493 |
| 4934 | **4200** | 3991 | 3773 | 3581 |
| 5043 | **4300** | 4088 | 3866 | 3670 |
| 5153 | **4400** | 4184 | 3958 | 3759 |
| 5263 | **4500** | 4281 | 4051 | 3848 |
| 5372 | **4600** | 4377 | 4143 | 3937 |
| 5482 | **4700** | 4474 | 4236 | 4026 |
| 5592 | **4800** | 4571 | 4329 | 4115 |
| 5701 | **4900** | 4667 | 4421 | 4204 |
| 5811 | **5000** | 4764 | 4514 | 4293 |
| 5921 | **5100** | 4860 | 4606 | 4382 |
| 6030 | **5200** | 4957 | 4699 | 4471 |
| 6140 | **5300** | 5053 | 4791 | 4559 |
| 6249 | **5400** | 5150 | 4884 | 4648 |
| 6359 | **5500** | 5246 | 4976 | 4737 |
| 6469 | **5600** | 5343 | 5069 | 4826 |
| 6578 | **5700** | 5439 | 5161 | 4915 |
| 6688 | **5800** | 5536 | 5254 | 5004 |
| 6798 | **5900** | 5633 | 5347 | 5093 |
| 6907 | **6000** | 5729 | 5439 | 5182 |
| 7017 | **6100** | 5826 | 5532 | 5271 |

TOWC1_TO_2_03

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 7017 | **6100** | 5826 | 5532 | 5271 |
| 7127 | **6200** | 5922 | 5624 | 5360 |
| 7236 | **6300** | 6019 | 5717 | 5449 |
| 7346 | **6400** | 6115 | 5809 | 5537 |
| 7455 | **6500** | 6212 | 5902 | 5626 |
| 7565 | **6600** | 6308 | 5994 | 5715 |
| 7675 | **6700** | 6405 | 6087 | 5804 |
| 7784 | **6800** | 6501 | 6179 | 5893 |
| 7894 | **6900** | 6598 | 6272 | 5982 |
| 8004 | **7000** | 6695 | 6365 | 6071 |
| 8113 | **7100** | 6791 | 6457 | 6160 |
| 8223 | **7200** | 6888 | 6550 | 6249 |
| 8333 | **7300** | 6984 | 6642 | 6338 |
| 8442 | **7400** | 7081 | 6735 | 6427 |
| 8552 | **7500** | 7177 | 6827 | 6515 |
| 8661 | **7600** | 7274 | 6920 | 6604 |
| 8771 | **7700** | 7370 | 7012 | 6693 |
| 8881 | **7800** | 7467 | 7105 | 6782 |
| 8990 | **7900** | 7563 | 7197 | 6871 |
| 9100 | **8000** | 7660 | 7290 | 6960 |
| 9210 | **8100** | 7757 | 7383 | 7049 |
| 9319 | **8200** | 7853 | 7475 | 7138 |
| 9429 | **8300** | 7950 | 7568 | 7227 |
| 9539 | **8400** | 8046 | 7660 | 7316 |
| 9648 | **8500** | 8143 | 7753 | 7405 |
| 9758 | **8600** | 8239 | 7845 | 7493 |
| 9867 | **8700** | 8336 | 7938 | 7582 |
| 9977 | **8800** | 8432 | 8030 | 7671 |
| 10087 | **8900** | 8529 | 8123 | 7760 |
| 10196 | **9000** | 8625 | 8215 | 7849 |
| 10306 | **9100** | 8722 | 8308 | 7938 |
| 10416 | **9200** | 8819 | 8401 | 8027 |
| 10525 | **9300** | 8915 | 8493 | 8116 |
| 10635 | **9400** | 9012 | 8586 | 8205 |

TOWC2_TO_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 2318 | 2209 | **2100** | 2096 | 2075 |
| 2409 | 2304 | **2200** | 2199 | 2186 |
| 2499 | 2400 | **2300** | 2303 | 2297 |
| 2590 | 2495 | **2400** | 2406 | 2409 |
| 2680 | 2590 | **2500** | 2510 | 2520 |
| 2770 | 2685 | **2600** | 2614 | 2631 |
| 2861 | 2780 | **2700** | 2717 | 2743 |
| 2951 | 2876 | **2800** | 2821 | 2854 |
| 3042 | 2971 | **2900** | 2924 | 2965 |
| 3132 | 3066 | **3000** | 3028 | 3077 |
| 3222 | 3161 | **3100** | 3131 | 3188 |
| 3313 | 3256 | **3200** | 3235 | 3299 |
| 3403 | 3352 | **3300** | 3338 | 3411 |
| 3494 | 3447 | **3400** | 3442 | 3522 |
| 3584 | 3542 | **3500** | 3546 | 3633 |
| 3674 | 3637 | **3600** | 3649 | 3745 |
| 3765 | 3732 | **3700** | 3753 | 3856 |
| 3855 | 3828 | **3800** | 3856 | 3967 |
| 3946 | 3923 | **3900** | 3960 | 4079 |
| 4036 | 4018 | **4000** | 4063 | 4190 |
| 4126 | 4113 | **4100** | 4167 | 4301 |
| 4217 | 4208 | **4200** | 4270 | 4413 |
| 4307 | 4304 | **4300** | 4374 | 4524 |
| 4398 | 4399 | **4400** | 4478 | 4635 |
| 4488 | 4494 | **4500** | 4581 | 4747 |
| 4578 | 4589 | **4600** | 4685 | 4858 |
| 4669 | 4684 | **4700** | 4788 | 4969 |
| 4759 | 4780 | **4800** | 4892 | 5081 |
| 4850 | 4875 | **4900** | 4995 | 5192 |
| 4940 | 4970 | **5000** | 5099 | 5303 |
| 5030 | 5065 | **5100** | 5202 | 5415 |
| 5121 | 5160 | **5200** | 5306 | 5526 |
| 5211 | 5256 | **5300** | 5410 | 5637 |
| 5302 | 5351 | **5400** | 5513 | 5749 |
| 5392 | 5446 | **5500** | 5617 | 5860 |
| 5482 | 5541 | **5600** | 5720 | 5971 |

TOSC1_TO_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 5482 | 5541 | **5600** | 5720 | 5971 |
| 5573 | 5636 | **5700** | 5824 | 6083 |
| 5663 | 5732 | **5800** | 5927 | 6194 |
| 5754 | 5827 | **5900** | 6031 | 6305 |
| 5844 | 5922 | **6000** | 6134 | 6417 |
| 5934 | 6017 | **6100** | 6238 | 6528 |
| 6025 | 6112 | **6200** | 6342 | 6639 |
| 6115 | 6208 | **6300** | 6445 | 6751 |
| 6206 | 6303 | **6400** | 6549 | 6862 |
| 6296 | 6398 | **6500** | 6652 | 6973 |
| 6386 | 6493 | **6600** | 6756 | 7085 |
| 6477 | 6588 | **6700** | 6859 | 7196 |
| 6567 | 6684 | **6800** | 6963 | 7307 |
| 6658 | 6779 | **6900** | 7066 | 7419 |
| 6748 | 6874 | **7000** | 7170 | 7530 |
| 6838 | 6969 | **7100** | 7274 | 7641 |
| 6929 | 7064 | **7200** | 7377 | 7753 |
| 7019 | 7160 | **7300** | 7481 | 7864 |
| 7110 | 7255 | **7400** | 7584 | 7975 |
| 7200 | 7350 | **7500** | 7688 | 8087 |
| 7290 | 7445 | **7600** | 7791 | 8198 |
| 7381 | 7540 | **7700** | 7895 | 8309 |
| 7471 | 7636 | **7800** | 7998 | 8421 |
| 7562 | 7731 | **7900** | 8102 | 8532 |
| 7652 | 7826 | **8000** | 8206 | 8643 |
| 7742 | 7921 | **8100** | 8309 | 8755 |
| 7833 | 8016 | **8200** | 8413 | 8866 |
| 7923 | 8112 | **8300** | 8516 | 8977 |
| 8014 | 8207 | **8400** | 8620 | 9089 |
| 8104 | 8302 | **8500** | 8723 | 9200 |
| 8194 | 8397 | **8600** | 8827 | 9311 |
| 8285 | 8492 | **8700** | 8930 | 9423 |
| 8375 | 8588 | **8800** | 9034 | 9534 |
| 8466 | 8683 | **8900** | 9138 | 9645 |

TOSC2_TO_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS TO/APPR, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | **◄ REF [0] ►** | 1 | 2 |
| 8466 | 8683 | **8900** | 9138 | 9645 |
| 8556 | 8778 | **9000** | 9241 | 9757 |
| 8646 | 8873 | **9100** | 9345 | 9868 |
| 8737 | 8968 | **9200** | 9448 | 9979 |
| 8827 | 9064 | **9300** | 9552 | 10091 |
| 8918 | 9159 | **9400** | 9655 | 10202 |
| 9008 | 9254 | **9500** | 9759 | 10313 |

TOSC3_TO_2_03

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -1000 | -40 | 10.3 | 9.9 | 8.9 | 7.9 | 7.0 | 6.1 | 5.1 |
| | 15 | 10.6 | 10.2 | 9.1 | 8.1 | 7.2 | 6.3 | 5.3 |
| | 25 | 10.7 | 10.3 | 9.2 | 8.2 | 7.3 | 6.4 | 5.4 |
| | 35 | 8.9 | 8.5 | 7.5 | 6.5 | 5.7 | 4.8 | 3.9 |
| | 40 | 7.7 | 7.3 | 6.3 | 5.4 | 4.6 | 3.8 | 3.0 |
| | 45 | 6.5 | 6.1 | 5.2 | 4.3 | 3.6 | 2.9 | 2.1 |
| | 50 | 5.2 | 4.9 | 4.0 | 3.2 | 2.5 | 1.9 | **1.2** |
| | 55 | 4.0 | 3.6 | 2.9 | 2.2 | **1.6** | **1.0** | **0.3** |
| Sea Level | -40 | 10.1 | 9.7 | 8.6 | 7.7 | 6.8 | 5.9 | 5.0 |
| | 15 | 10.4 | 10.0 | 8.9 | 8.0 | 7.0 | 6.2 | 5.2 |
| | 25 | 10.5 | 10.1 | 9.0 | 8.0 | 7.1 | 6.2 | 5.2 |
| | 35 | 8.3 | 7.9 | 6.9 | 6.0 | 5.1 | 4.3 | 3.4 |
| | 40 | 7.1 | 6.6 | 5.7 | 4.9 | 4.1 | 3.3 | 2.5 |
| | 45 | 5.8 | 5.5 | 4.6 | 3.8 | 3.0 | 2.4 | 1.6 |
| | 50 | 4.6 | 4.2 | 3.4 | 2.7 | 2.0 | 1.4 | **0.7** |
| | 55 | 3.4 | 3.0 | 2.3 | **1.7** | **1.1** | **0.5** | **-0.1** |
| 1000 | -40 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.6 | 4.7 |
| | 15 | 10.1 | 9.7 | 8.6 | 7.6 | 6.7 | 5.9 | 4.9 |
| | 25 | 9.7 | 9.3 | 8.3 | 7.3 | 6.4 | 5.5 | 4.6 |
| | 30 | 8.6 | 8.2 | 7.2 | 6.3 | 5.4 | 4.6 | 3.7 |
| | 35 | 7.5 | 7.1 | 6.1 | 5.3 | 4.4 | 3.7 | 2.8 |
| | 40 | 6.3 | 5.9 | 5.0 | 4.2 | 3.4 | 2.7 | 2.0 |
| | 45 | 5.1 | 4.7 | 3.9 | 3.1 | 2.4 | 1.8 | **1.1** |
| | 50 | 3.9 | 3.5 | 2.8 | 2.1 | **1.5** | **0.9** | **0.2** |
| 2000 | -40 | 9.4 | 9.0 | 8.0 | 7.0 | 6.1 | 5.3 | 4.4 |
| | 10 | 9.7 | 9.3 | 8.3 | 7.3 | 6.4 | 5.5 | 4.6 |
| | 20 | 9.8 | 9.3 | 8.3 | 7.4 | 6.4 | 5.6 | 4.6 |
| | 30 | 7.8 | 7.4 | 6.4 | 5.5 | 4.7 | 3.9 | 3.1 |
| | 35 | 6.7 | 6.3 | 5.4 | 4.6 | 3.8 | 3.1 | 2.3 |
| | 40 | 5.6 | 5.2 | 4.3 | 3.5 | 2.8 | 2.2 | 1.4 |
| | 45 | 4.4 | 4.0 | 3.2 | 2.5 | 1.9 | **1.2** | **0.6** |
| | 50 | 3.2 | 2.9 | 2.2 | **1.5** | **0.9** | **0.4** | **-0.3** |

TCG2_TO_0_-1_06

| Net Takeoff Climb Gradient, Second Segment [%]<br>Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 3000 | -40 | 9.0 | 8.6 | 7.6 | 6.7 | 5.8 | 5.0 | 4.1 |
| | 10 | 9.4 | 8.9 | 7.9 | 7.0 | 6.1 | 5.2 | 4.3 |
| | 20 | 9.2 | 8.8 | 7.8 | 6.8 | 5.9 | 5.1 | 4.2 |
| | 25 | 8.1 | 7.7 | 6.7 | 5.8 | 4.9 | 4.2 | 3.3 |
| | 30 | 7.0 | 6.6 | 5.7 | 4.8 | 4.0 | 3.3 | 2.5 |
| | 35 | 5.9 | 5.5 | 4.6 | 3.8 | 3.1 | 2.4 | 1.7 |
| | 40 | 4.8 | 4.4 | 3.6 | 2.9 | 2.2 | 1.6 | **0.9** |
| | 45 | 3.7 | 3.3 | 2.6 | 1.9 | **1.3** | **0.7** | **0.1** |
| 4000 | -40 | 8.7 | 8.3 | 7.3 | 6.4 | 5.5 | 4.7 | 3.8 |
| | 10 | 9.0 | 8.6 | 7.6 | 6.6 | 5.7 | 4.9 | 4.0 |
| | 20 | 8.4 | 7.9 | 7.0 | 6.0 | 5.2 | 4.4 | 3.5 |
| | 25 | 7.3 | 6.9 | 5.9 | 5.0 | 4.2 | 3.5 | 2.7 |
| | 30 | 6.1 | 5.8 | 4.9 | 4.0 | 3.3 | 2.6 | 1.8 |
| | 35 | 5.1 | 4.7 | 3.9 | 3.1 | 2.4 | 1.8 | **1.1** |
| | 40 | 4.0 | 3.7 | 2.9 | 2.2 | 1.6 | **1.0** | **0.3** |
| | 45 | 3.0 | 2.7 | 2.0 | **1.3** | **0.8** | **0.2** | |
| 5000 | -40 | 8.3 | 7.9 | 7.0 | 6.0 | 5.2 | 4.4 | 3.5 |
| | 5 | 8.6 | 8.2 | 7.2 | 6.2 | 5.4 | 4.6 | 3.7 |
| | 15 | 8.6 | 8.1 | 7.2 | 6.2 | 5.4 | 4.6 | 3.7 |
| | 25 | 6.4 | 6.0 | 5.1 | 4.3 | 3.5 | 2.8 | 2.0 |
| | 30 | 5.3 | 4.9 | 4.1 | 3.3 | 2.6 | 2.0 | 1.2 |
| | 35 | 4.3 | 3.9 | 3.2 | 2.4 | 1.8 | **1.2** | **0.5** |
| | 40 | 3.2 | 2.9 | 2.2 | **1.6** | **1.0** | **0.4** | **-0.2** |
| | 45 | 2.2 | **2.0** | **1.3** | **0.7** | **0.2** | | |
| 6000 | -40 | 8.0 | 7.6 | 6.7 | 5.7 | 4.9 | 4.1 | 3.3 |
| | 0 | 8.2 | 7.8 | 6.8 | 5.9 | 5.0 | 4.2 | 3.4 |
| | 10 | 8.2 | 7.7 | 6.8 | 5.8 | 5.0 | 4.2 | 3.3 |
| | 20 | 6.7 | 6.3 | 5.4 | 4.5 | 3.7 | 3.0 | 2.2 |
| | 25 | 5.6 | 5.2 | 4.4 | 3.6 | 2.8 | 2.2 | 1.4 |
| | 30 | 4.5 | 4.2 | 3.4 | 2.6 | 2.0 | 1.4 | **0.7** |
| | 35 | 3.5 | 3.2 | 2.4 | 1.8 | **1.2** | **0.6** | **0.0** |
| | 40 | 2.5 | 2.2 | **1.6** | **0.9** | **0.4** | **-0.1** | |

TCG2_TO_0_3_06

Net Takeoff Climb Gradient, Second Segment [%]
Zero Slope, No Wind

**Flaps TO/APPR, Gear UP, Ice Protection Off, V2**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 7000 | -40 | 7.7 | 7.3 | 6.3 | 5.4 | 4.6 | 3.9 | 3.0 |
| | 0 | 7.8 | 7.4 | 6.4 | 5.5 | 4.7 | 3.9 | 3.1 |
| | 10 | 7.7 | 7.3 | 6.4 | 5.5 | 4.6 | 3.9 | 3.0 |
| | 15 | 6.9 | 6.5 | 5.6 | 4.7 | 3.9 | 3.2 | 2.4 |
| | 20 | 5.9 | 5.5 | 4.6 | 3.8 | 3.1 | 2.4 | 1.6 |
| | 25 | 4.8 | 4.4 | 3.6 | 2.9 | 2.2 | 1.6 | 0.9 |
| | 30 | 3.7 | 3.4 | 2.7 | 2.0 | 1.4 | 0.8 | 0.1 |
| | 35 | 2.8 | 2.5 | 1.8 | 1.2 | 0.6 | 0.1 | |
| 8000 | -40 | 7.4 | 7.0 | 6.0 | 5.2 | 4.3 | 3.6 | 2.8 |
| | -10 | 7.4 | 7.1 | 6.1 | 5.2 | 4.4 | 3.6 | 2.8 |
| | 0 | 7.4 | 7.0 | 6.0 | 5.1 | 4.3 | 3.6 | 2.8 |
| | 10 | 7.2 | 6.8 | 5.8 | 4.9 | 4.1 | 3.4 | 2.6 |
| | 15 | 6.0 | 5.7 | 4.8 | 4.0 | 3.2 | 2.5 | 1.8 |
| | 20 | 5.0 | 4.7 | 3.8 | 3.1 | 2.4 | 1.7 | 1.0 |
| | 25 | 4.0 | 3.6 | 2.9 | 2.2 | 1.6 | 1.0 | 0.3 |
| | 30 | 3.0 | 2.7 | 2.0 | 1.3 | 0.8 | 0.2 | |
| 9000 | -40 | 7.1 | 6.7 | 5.7 | 4.9 | 4.1 | 3.3 | 2.5 |
| | -10 | 7.0 | 6.6 | 5.7 | 4.8 | 4.0 | 3.3 | 2.5 |
| | 0 | 7.0 | 6.6 | 5.7 | 4.8 | 4.0 | 3.3 | 2.5 |
| | 10 | 6.3 | 5.9 | 5.0 | 4.2 | 3.4 | 2.7 | 1.9 |
| | 15 | 5.2 | 4.9 | 4.0 | 3.2 | 2.5 | 1.9 | 1.2 |
| | 20 | 4.2 | 3.9 | 3.1 | 2.4 | 1.7 | 1.1 | 0.5 |
| | 25 | 3.2 | 2.9 | 2.2 | 1.5 | 0.9 | 0.4 | -0.2 |
| | 30 | 2.3 | 2.0 | 1.3 | 0.7 | 0.2 | | |
| 10,000 | -40 | 6.7 | 6.3 | 5.4 | 4.5 | 3.7 | 3.0 | 2.2 |
| | -15 | 6.6 | 6.2 | 5.3 | 4.5 | 3.7 | 3.0 | 2.2 |
| | -5 | 6.6 | 6.2 | 5.3 | 4.5 | 3.7 | 3.0 | 2.2 |
| | 5 | 6.5 | 6.2 | 5.3 | 4.4 | 3.6 | 2.9 | 2.1 |
| | 10 | 5.4 | 5.1 | 4.2 | 3.4 | 2.7 | 2.0 | 1.3 |
| | 15 | 4.4 | 4.1 | 3.3 | 2.6 | 1.9 | 1.3 | 0.6 |
| | 20 | 3.4 | 3.1 | 2.4 | 1.7 | 1.1 | 0.6 | -0.1 |
| | 25 | 2.5 | 2.2 | 1.5 | 0.9 | 0.4 | -0.2 | |

TCG2_TO_0_7_06

| Wind Corrected Takeoff Climb Gradient [%] | | | | |
|---|---|---|---|---|
| FLAPS UP and TO/APPR, V2, Ice Protection Off | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.0 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.5 |
| 0.9 | **1.0** | 1.0 | 1.0 | 1.1 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.8 | **2.0** | 2.1 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.7 | 2.8 |
| 2.7 | **3.0** | 3.1 | 3.2 | 3.4 |
| 3.2 | **3.5** | 3.6 | 3.8 | 3.9 |
| 3.6 | **4.0** | 4.2 | 4.3 | 4.5 |
| 4.0 | **4.5** | 4.7 | 4.9 | 5.1 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.7 |
| 4.9 | **5.5** | 5.7 | 6.0 | 6.2 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.8 |
| 5.8 | **6.5** | 6.8 | 7.1 | 7.4 |
| 6.3 | **7.0** | 7.3 | 7.6 | 7.9 |
| 6.7 | **7.5** | 7.8 | 8.2 | 8.5 |
| 7.1 | **8.0** | 8.3 | 8.7 | 9.1 |
| 7.6 | **8.5** | 8.9 | 9.2 | 9.7 |
| 8.0 | **9.0** | 9.4 | 9.8 | 10.2 |
| 8.5 | **9.5** | 9.9 | 10.3 | 10.8 |
| 8.9 | **10.0** | 10.4 | 10.9 | 11.4 |
| 9.4 | **10.5** | 10.9 | 11.4 | 12.0 |
| 9.8 | **11.0** | 11.5 | 12.0 | 12.5 |
| 10.2 | **11.5** | 12.0 | 12.5 | 13.1 |
| 10.7 | **12.0** | 12.5 | 13.1 | 13.7 |

CGWC_TO_ALL_05

**NOTE** Use this table when determining the ground reference flight path for obstacle clearance with Ice Protection Off.

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -1000 | -40 | 10.3 | 9.9 | 8.9 | 7.9 | 7.0 | 6.1 | 5.2 |
| | -30 | 10.4 | 9.9 | 8.9 | 7.9 | 7.0 | 6.1 | 5.2 |
| | -20 | 10.4 | 10.0 | 8.9 | 8.0 | 7.0 | 6.2 | 5.2 |
| | -10 | 10.5 | 10.0 | 9.0 | 8.0 | 7.1 | 6.2 | 5.2 |
| | -5 | 10.5 | 10.1 | 9.0 | 8.1 | 7.1 | 6.2 | 5.3 |
| | 0 | 10.6 | 10.1 | 9.1 | 8.1 | 7.2 | 6.3 | 5.3 |
| | 5 | 10.6 | 10.2 | 9.1 | 8.1 | 7.2 | 6.3 | 5.3 |
| | 10 | 10.6 | 10.2 | 9.1 | 8.2 | 7.2 | 6.3 | 5.3 |
| Sea Level | -40 | 10.1 | 9.7 | 8.7 | 7.7 | 6.8 | 5.9 | 5.0 |
| | -30 | 10.1 | 9.7 | 8.7 | 7.7 | 6.8 | 6.0 | 5.0 |
| | -20 | 10.2 | 9.8 | 8.8 | 7.8 | 6.9 | 6.0 | 5.0 |
| | -10 | 10.3 | 9.9 | 8.8 | 7.8 | 6.9 | 6.1 | 5.1 |
| | -5 | 10.3 | 9.9 | 8.9 | 7.9 | 7.0 | 6.1 | 5.1 |
| | 0 | 10.4 | 10.0 | 8.9 | 7.9 | 7.0 | 6.1 | 5.1 |
| | 5 | 10.4 | 10.0 | 8.9 | 8.0 | 7.0 | 6.2 | 5.2 |
| | 10 | 10.5 | 10.0 | 9.0 | 8.0 | 7.1 | 6.2 | 5.2 |
| 1000 | -40 | 9.8 | 9.3 | 8.3 | 7.4 | 6.5 | 5.6 | 4.7 |
| | -30 | 9.8 | 9.4 | 8.4 | 7.4 | 6.5 | 5.7 | 4.7 |
| | -20 | 9.9 | 9.5 | 8.4 | 7.5 | 6.6 | 5.7 | 4.8 |
| | -10 | 10.0 | 9.5 | 8.5 | 7.6 | 6.6 | 5.8 | 4.8 |
| | -5 | 10.0 | 9.6 | 8.6 | 7.6 | 6.7 | 5.8 | 4.8 |
| | 0 | 10.1 | 9.6 | 8.6 | 7.6 | 6.7 | 5.8 | 4.9 |
| | 5 | 10.1 | 9.6 | 8.6 | 7.6 | 6.7 | 5.8 | 4.9 |
| | 10 | 9.6 | 9.2 | 8.2 | 7.2 | 6.3 | 5.5 | 4.5 |
| 2000 | -40 | 9.4 | 9.0 | 8.0 | 7.1 | 6.2 | 5.3 | 4.4 |
| | -30 | 9.5 | 9.1 | 8.1 | 7.1 | 6.2 | 5.4 | 4.4 |
| | -20 | 9.6 | 9.2 | 8.1 | 7.2 | 6.3 | 5.4 | 4.5 |
| | -10 | 9.7 | 9.2 | 8.2 | 7.3 | 6.4 | 5.5 | 4.6 |
| | -5 | 9.7 | 9.3 | 8.2 | 7.3 | 6.4 | 5.5 | 4.6 |
| | 0 | 9.7 | 9.3 | 8.3 | 7.3 | 6.4 | 5.5 | 4.6 |
| | 5 | 9.7 | 9.3 | 8.3 | 7.3 | 6.4 | 5.6 | 4.6 |
| | 10 | 8.8 | 8.4 | 7.4 | 6.5 | 5.6 | 4.8 | 3.9 |

TCG2_TO_2_-1_02

| Net Takeoff Climb Gradient, Second Segment [%]<br>Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 3000 | -40 | 9.1 | 8.7 | 7.7 | 6.8 | 5.8 | 5.0 | 4.1 |
| | -30 | 9.2 | 8.7 | 7.7 | 6.8 | 5.9 | 5.1 | 4.2 |
| | -20 | 9.2 | 8.8 | 7.8 | 6.9 | 6.0 | 5.2 | 4.2 |
| | -10 | 9.3 | 8.9 | 7.9 | 6.9 | 6.0 | 5.2 | 4.3 |
| | -5 | 9.3 | 8.9 | 7.9 | 7.0 | 6.1 | 5.2 | 4.3 |
| | 0 | 9.4 | 8.9 | 7.9 | 7.0 | 6.1 | 5.2 | 4.3 |
| | 5 | 9.2 | 8.7 | 7.7 | 6.8 | 5.9 | 5.1 | 4.1 |
| | 10 | 7.9 | 7.5 | 6.6 | 5.7 | 4.8 | 4.0 | 3.2 |
| 4000 | -40 | 8.7 | 8.3 | 7.3 | 6.4 | 5.5 | 4.7 | 3.8 |
| | -30 | 8.8 | 8.4 | 7.4 | 6.5 | 5.6 | 4.8 | 3.9 |
| | -20 | 8.9 | 8.5 | 7.5 | 6.6 | 5.7 | 4.9 | 3.9 |
| | -10 | 9.0 | 8.5 | 7.5 | 6.6 | 5.7 | 4.9 | 4.0 |
| | -5 | 9.0 | 8.6 | 7.6 | 6.6 | 5.7 | 4.9 | 4.0 |
| | 0 | 9.0 | 8.6 | 7.6 | 6.7 | 5.7 | 4.9 | 4.0 |
| | 5 | 8.3 | 7.9 | 7.0 | 6.0 | 5.2 | 4.4 | 3.5 |
| | 10 | 7.0 | 6.6 | 5.7 | 4.8 | 4.0 | 3.3 | 2.5 |
| 5000 | -40 | 8.4 | 8.0 | 7.1 | 6.1 | 5.3 | 4.5 | 3.6 |
| | -30 | 8.5 | 8.1 | 7.1 | 6.2 | 5.3 | 4.5 | 3.6 |
| | -20 | 8.5 | 8.1 | 7.2 | 6.2 | 5.4 | 4.6 | 3.7 |
| | -10 | 8.6 | 8.2 | 7.2 | 6.3 | 5.4 | 4.6 | 3.7 |
| | -5 | 8.6 | 8.2 | 7.2 | 6.3 | 5.4 | 4.6 | 3.7 |
| | 0 | 8.6 | 8.2 | 7.2 | 6.3 | 5.4 | 4.6 | 3.7 |
| | 5 | 7.5 | 7.1 | 6.1 | 5.2 | 4.4 | 3.6 | 2.8 |
| | 10 | 6.1 | 5.7 | 4.8 | 4.0 | 3.2 | 2.5 | 1.8 |
| 6000 | -40 | 8.1 | 7.7 | 6.7 | 5.8 | 5.0 | 4.2 | 3.3 |
| | -30 | 8.2 | 7.7 | 6.8 | 5.9 | 5.0 | 4.2 | 3.4 |
| | -20 | 8.2 | 7.8 | 6.9 | 5.9 | 5.1 | 4.3 | 3.4 |
| | -10 | 8.2 | 7.8 | 6.9 | 5.9 | 5.1 | 4.3 | 3.4 |
| | -5 | 8.2 | 7.8 | 6.9 | 5.9 | 5.1 | 4.3 | 3.4 |
| | 0 | 7.8 | 7.4 | 6.4 | 5.5 | 4.7 | 3.9 | 3.1 |
| | 5 | 6.5 | 6.1 | 5.2 | 4.4 | 3.6 | 2.9 | 2.1 |
| | 10 | 5.1 | 4.8 | 3.9 | 3.2 | 2.5 | 1.8 | 1.1 |

TCG2_TO_2_3_02

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 7000 | -40 | 7.8 | 7.4 | 6.4 | 5.5 | 4.7 | 3.9 | 3.1 |
| | -30 | 7.8 | 7.4 | 6.5 | 5.6 | 4.7 | 4.0 | 3.1 |
| | -20 | 7.9 | 7.5 | 6.5 | 5.6 | 4.8 | 4.0 | 3.1 |
| | -10 | 7.9 | 7.5 | 6.5 | 5.6 | 4.8 | 4.0 | 3.1 |
| | -5 | 7.8 | 7.4 | 6.5 | 5.6 | 4.7 | 4.0 | 3.1 |
| | 0 | 6.9 | 6.5 | 5.6 | 4.7 | 3.9 | 3.2 | 2.4 |
| | 5 | 5.6 | 5.2 | 4.3 | 3.5 | 2.8 | 2.2 | 1.4 |
| | 10 | 4.2 | 3.9 | 3.1 | 2.4 | 1.8 | 1.2 | 0.5 |
| 8000 | -40 | 7.4 | 7.1 | 6.1 | 5.2 | 4.4 | 3.6 | 2.8 |
| | -30 | 7.5 | 7.1 | 6.1 | 5.3 | 4.4 | 3.7 | 2.9 |
| | -20 | 7.5 | 7.1 | 6.1 | 5.3 | 4.4 | 3.7 | 2.9 |
| | -10 | 7.5 | 7.1 | 6.1 | 5.2 | 4.4 | 3.6 | 2.8 |
| | -5 | 7.3 | 6.8 | 5.9 | 5.0 | 4.2 | 3.5 | 2.6 |
| | 0 | 6.0 | 5.6 | 4.7 | 3.9 | 3.1 | 2.5 | 1.7 |
| | 5 | 4.7 | 4.3 | 3.5 | 2.8 | 2.1 | 1.5 | 0.8 |
| | 10 | 3.4 | 3.1 | 2.4 | 1.7 | 1.1 | 0.5 | -0.1 |
| 9000 | -40 | 7.1 | 6.7 | 5.8 | 4.9 | 4.1 | 3.4 | 2.5 |
| | -30 | 7.2 | 6.7 | 5.8 | 4.9 | 4.1 | 3.4 | 2.6 |
| | -20 | 7.1 | 6.7 | 5.8 | 4.9 | 4.1 | 3.4 | 2.5 |
| | -10 | 7.1 | 6.6 | 5.7 | 4.8 | 4.0 | 3.3 | 2.5 |
| | -5 | 6.3 | 5.9 | 5.0 | 4.2 | 3.5 | 2.8 | 2.0 |
| | 0 | 5.1 | 4.7 | 3.9 | 3.1 | 2.4 | 1.8 | 1.1 |
| | 5 | 3.8 | 3.5 | 2.7 | 2.0 | 1.4 | 0.8 | 0.2 |
| | 10 | 2.6 | 2.3 | 1.6 | 1.0 | 0.5 | -0.1 | |
| 10,000 | -40 | 6.7 | 6.3 | 5.4 | 4.6 | 3.8 | 3.1 | 2.3 |
| | -30 | 6.7 | 6.3 | 5.4 | 4.6 | 3.8 | 3.1 | 2.3 |
| | -20 | 6.7 | 6.2 | 5.3 | 4.5 | 3.7 | 3.0 | 2.2 |
| | -10 | 6.6 | 6.2 | 5.3 | 4.5 | 3.7 | 3.0 | 2.2 |
| | -5 | 5.5 | 5.1 | 4.2 | 3.5 | 2.8 | 2.1 | 1.4 |
| | 0 | 4.2 | 3.8 | 3.1 | 2.4 | 1.7 | 1.1 | 0.5 |
| | 5 | 2.9 | 2.7 | 2.0 | 1.3 | 0.7 | 0.2 | -0.4 |
| | 10 | 1.8 | 1.6 | 0.9 | 0.4 | -0.2 | | |

TCG2_TO_2_7_02

| Wind Corrected Takeoff Climb Gradient [%] | | | | |
|---|---|---|---|---|
| **FLAPS UP and TO/APPR, V2, Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.4 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.0 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.9 | **2.0** | 2.0 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.7 |
| 2.7 | **3.0** | 3.1 | 3.2 | 3.3 |
| 3.2 | **3.5** | 3.6 | 3.7 | 3.9 |
| 3.6 | **4.0** | 4.1 | 4.3 | 4.4 |
| 4.1 | **4.5** | 4.7 | 4.8 | 5.0 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.6 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.2 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.7 |
| 5.8 | **6.5** | 6.8 | 7.0 | 7.3 |
| 6.3 | **7.0** | 7.3 | 7.6 | 7.9 |
| 6.7 | **7.5** | 7.8 | 8.1 | 8.5 |
| 7.2 | **8.0** | 8.3 | 8.7 | 9.0 |
| 7.6 | **8.5** | 8.8 | 9.2 | 9.6 |
| 8.1 | **9.0** | 9.4 | 9.8 | 10.2 |
| 8.5 | **9.5** | 9.9 | 10.3 | 10.8 |
| 8.9 | **10.0** | 10.4 | 10.9 | 11.3 |
| 9.4 | **10.5** | 10.9 | 11.4 | 11.9 |
| 9.8 | **11.0** | 11.5 | 11.9 | 12.5 |
| 10.3 | **11.5** | 12.0 | 12.5 | 13.1 |
| 10.7 | **12.0** | 12.5 | 13.0 | 13.6 |

CGWC_UP_2_03

**NOTE** Use this table when determining the ground reference flight path for obstacle clearance with Ice Protection On.

| Net Takeoff Climb Gradient, Final Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -1000 | -40 | 9.8 | 9.4 | 8.5 | 7.6 | 6.9 | 6.1 | 5.3 |
| | 15 | 10.2 | 9.8 | 8.9 | 8.0 | 7.2 | 6.4 | 5.6 |
| | 25 | 10.3 | 9.9 | 8.9 | 8.0 | 7.2 | 6.5 | 5.7 |
| | 35 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 40 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 45 | 6.5 | 6.2 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | 50 | 5.3 | 5.1 | 4.4 | 3.7 | 3.2 | 2.6 | **2.0** |
| | 55 | 4.2 | 4.0 | 3.3 | 2.8 | **2.3** | **1.8** | **1.2** |
| Sea Level | -40 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | 15 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 25 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 35 | 7.8 | 7.4 | 6.6 | 5.8 | 5.2 | 4.5 | 3.8 |
| | 40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 |
| | 45 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | 2.3 |
| | 50 | 4.7 | 4.4 | 3.8 | 3.2 | 2.6 | 2.1 | **1.5** |
| | 55 | 3.6 | 3.4 | 2.8 | **2.2** | **1.7** | **1.3** | **0.7** |
| 1000 | -40 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 15 | 9.5 | 9.1 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | 25 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 30 | 8.0 | 7.7 | 6.8 | 6.1 | 5.4 | 4.7 | 4.0 |
| | 35 | 7.0 | 6.7 | 5.9 | 5.2 | 4.5 | 3.9 | 3.2 |
| | 40 | 6.0 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 | 2.5 |
| | 45 | 5.1 | 4.8 | 4.1 | 3.5 | 2.9 | 2.4 | **1.8** |
| | 50 | 4.1 | 3.8 | 3.2 | 2.6 | **2.1** | **1.6** | **1.1** |
| 2000 | -40 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 10 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 20 | 9.2 | 8.8 | 7.9 | 7.1 | 6.3 | 5.6 | 4.8 |
| | 30 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | 35 | 6.2 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 |
| | 40 | 5.3 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.0 |
| | 45 | 4.4 | 4.1 | 3.5 | 2.9 | 2.4 | **1.9** | **1.3** |
| | 50 | 3.5 | 3.2 | 2.6 | **2.1** | **1.6** | **1.2** | **0.6** |

TCG3_TO_0_-1_06

| Net Takeoff Climb Gradient, Final Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 3000 | -40 | 8.4 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 10 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 20 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 25 | 7.4 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.6 |
| | 30 | 6.4 | 6.1 | 5.3 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 35 | 5.5 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.1 |
| | 40 | 4.6 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 |
| | 45 | 3.7 | 3.5 | 2.9 | 2.4 | 1.9 | 1.4 | 0.9 |
| 4000 | -40 | 8.1 | 7.7 | 6.9 | 6.1 | 5.4 | 4.8 | 4.0 |
| | 10 | 8.3 | 8.0 | 7.1 | 6.3 | 5.6 | 5.0 | 4.2 |
| | 20 | 7.7 | 7.3 | 6.5 | 5.8 | 5.1 | 4.5 | 3.8 |
| | 25 | 6.6 | 6.3 | 5.5 | 4.9 | 4.2 | 3.6 | 3.0 |
| | 30 | 5.6 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 | 2.3 |
| | 35 | 4.8 | 4.5 | 3.8 | 3.2 | 2.7 | 2.2 | 1.6 |
| | 40 | 3.9 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 |
| | 45 | 3.1 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 | |
| 5000 | -40 | 7.7 | 7.4 | 6.6 | 5.8 | 5.1 | 4.5 | 3.8 |
| | 5 | 7.9 | 7.6 | 6.7 | 6.0 | 5.3 | 4.6 | 3.9 |
| | 15 | 7.9 | 7.5 | 6.7 | 6.0 | 5.3 | 4.6 | 3.9 |
| | 25 | 5.9 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 | 2.4 |
| | 30 | 4.9 | 4.7 | 4.0 | 3.4 | 2.8 | 2.3 | 1.7 |
| | 35 | 4.1 | 3.8 | 3.2 | 2.7 | 2.1 | 1.7 | 1.1 |
| | 40 | 3.3 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | 0.5 |
| | 45 | 2.5 | 2.3 | 1.8 | 1.3 | 0.9 | | |
| 6000 | -40 | 7.4 | 7.1 | 6.3 | 5.5 | 4.9 | 4.2 | 3.6 |
| | 0 | 7.5 | 7.2 | 6.4 | 5.6 | 5.0 | 4.3 | 3.6 |
| | 10 | 7.5 | 7.2 | 6.3 | 5.6 | 4.9 | 4.3 | 3.6 |
| | 20 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | 25 | 5.2 | 4.9 | 4.2 | 3.6 | 3.0 | 2.5 | 1.9 |
| | 30 | 4.3 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 | 1.3 |
| | 35 | 3.5 | 3.2 | 2.7 | 2.1 | 1.6 | 1.2 | 0.7 |
| | 40 | 2.7 | 2.5 | 1.9 | 1.5 | 1.0 | 0.6 | |

TCG3_TO_0_3_06

**Net Takeoff Climb Gradient, Final Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection Off, 140 KIAS**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 7000 | -40 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 0 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 10 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 15 | 6.4 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 |
| | 20 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| | 25 | 4.5 | 4.2 | 3.6 | 3.0 | 2.5 | 2.0 | **1.4** |
| | 30 | 3.7 | 3.4 | 2.8 | 2.3 | **1.8** | **1.3** | **0.8** |
| | 35 | 2.9 | 2.7 | **2.1** | **1.6** | **1.2** | **0.7** | |
| 8000 | -40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.3 | 3.8 | 3.1 |
| | -10 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | 0 | 6.8 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 |
| | 10 | 6.6 | 6.3 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 |
| | 15 | 5.7 | 5.4 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 |
| | 20 | 4.7 | 4.5 | 3.8 | 3.2 | 2.7 | 2.2 | **1.6** |
| | 25 | 3.9 | 3.6 | 3.0 | 2.5 | 2.0 | **1.5** | **1.0** |
| | 30 | 3.1 | 2.9 | 2.3 | **1.8** | **1.3** | **0.9** | |
| 9000 | -40 | 6.4 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.8 |
| | -10 | 6.4 | 6.1 | 5.3 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 0 | 6.4 | 6.1 | 5.4 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 10 | 5.9 | 5.6 | 4.9 | 4.2 | 3.6 | 3.1 | 2.4 |
| | 15 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 | **1.8** |
| | 20 | 4.1 | 3.8 | 3.2 | 2.7 | 2.1 | **1.7** | **1.1** |
| | 25 | 3.3 | 3.0 | 2.5 | **2.0** | **1.5** | **1.0** | **0.5** |
| | 30 | 2.5 | **2.3** | **1.8** | **1.3** | **0.9** | | |
| 10,000 | -40 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -15 | 6.0 | 5.7 | 5.0 | 4.4 | 3.7 | 3.2 | 2.5 |
| | -5 | 6.1 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 | 2.6 |
| | 5 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | 10 | 5.2 | 4.9 | 4.2 | 3.6 | 3.1 | 2.5 | 1.9 |
| | 15 | 4.3 | 4.1 | 3.4 | 2.9 | 2.3 | 1.8 | **1.3** |
| | 20 | 3.5 | 3.2 | 2.7 | 2.1 | **1.6** | **1.2** | **0.7** |
| | 25 | 2.7 | 2.5 | **1.9** | **1.5** | **1.0** | **0.6** | |

TCG3_TO_0_7_06

| Wind Corrected Enroute Climb Gradient [%] | | | | |
|---|---|---|---|---|
| **FLAPS UP, 140 [KIAS], Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.1 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.7 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.2 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.8 |
| 1.9 | **2.0** | 2.1 | 2.1 | 2.3 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.9 |
| 2.8 | **3.0** | 3.1 | 3.2 | 3.5 |
| 3.2 | **3.5** | 3.6 | 3.7 | 4.0 |
| 3.7 | **4.0** | 4.1 | 4.3 | 4.6 |
| 4.1 | **4.5** | 4.6 | 4.8 | 5.2 |
| 4.6 | **5.0** | 5.2 | 5.3 | 5.7 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.3 |
| 5.5 | **6.0** | 6.2 | 6.4 | 6.8 |
| 5.9 | **6.5** | 6.7 | 7.0 | 7.4 |
| 6.4 | **7.0** | 7.2 | 7.5 | 8.0 |
| 6.8 | **7.5** | 7.8 | 8.1 | 8.5 |
| 7.3 | **8.0** | 8.3 | 8.6 | 9.1 |
| 7.7 | **8.5** | 8.8 | 9.1 | 9.7 |
| 8.1 | **9.0** | 9.3 | 9.7 | 10.2 |
| 8.6 | **9.5** | 9.8 | 10.2 | 10.8 |
| 9.0 | **10.0** | 10.4 | 10.8 | 11.4 |
| 9.5 | **10.5** | 10.9 | 11.3 | 11.9 |
| 9.9 | **11.0** | 11.4 | 11.8 | 12.5 |
| 10.4 | **11.5** | 11.9 | 12.4 | 13.0 |
| 10.8 | **12.0** | 12.4 | 12.9 | 13.6 |

ECGWC_UP_ALL_05

| Net Takeoff Climb Gradient, Final Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flaps UP, Gear UP, Ice Protection On, 140 KIAS | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -1000 | -40 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | -30 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| | -20 | 10.0 | 9.6 | 8.6 | 7.8 | 7.0 | 6.3 | 5.5 |
| | -10 | 10.1 | 9.7 | 8.7 | 7.9 | 7.1 | 6.3 | 5.5 |
| | -5 | 10.1 | 9.7 | 8.8 | 7.9 | 7.1 | 6.4 | 5.6 |
| | 0 | 10.2 | 9.8 | 8.8 | 7.9 | 7.1 | 6.4 | 5.6 |
| | 5 | 10.2 | 9.8 | 8.8 | 8.0 | 7.2 | 6.4 | 5.6 |
| | 10 | 10.3 | 9.8 | 8.9 | 8.0 | 7.2 | 6.5 | 5.6 |
| Sea Level | -40 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | -30 | 9.6 | 9.2 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | -20 | 9.7 | 9.3 | 8.3 | 7.5 | 6.7 | 6.0 | 5.2 |
| | -10 | 9.8 | 9.4 | 8.4 | 7.6 | 6.8 | 6.1 | 5.3 |
| | -5 | 9.8 | 9.4 | 8.5 | 7.6 | 6.8 | 6.1 | 5.3 |
| | 0 | 9.8 | 9.4 | 8.5 | 7.6 | 6.9 | 6.1 | 5.3 |
| | 5 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 10 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| 1000 | -40 | 9.2 | 8.8 | 7.9 | 7.0 | 6.3 | 5.6 | 4.8 |
| | -30 | 9.2 | 8.8 | 7.9 | 7.1 | 6.4 | 5.7 | 4.9 |
| | -20 | 9.3 | 8.9 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 |
| | -10 | 9.4 | 9.0 | 8.1 | 7.3 | 6.5 | 5.8 | 5.0 |
| | -5 | 9.4 | 9.1 | 8.1 | 7.3 | 6.5 | 5.8 | 5.0 |
| | 0 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | 5 | 9.5 | 9.1 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | 10 | 9.0 | 8.6 | 7.7 | 6.9 | 6.2 | 5.5 | 4.7 |
| 2000 | -40 | 8.8 | 8.4 | 7.6 | 6.7 | 6.0 | 5.3 | 4.6 |
| | -30 | 8.9 | 8.5 | 7.6 | 6.8 | 6.1 | 5.4 | 4.6 |
| | -20 | 9.0 | 8.6 | 7.7 | 6.9 | 6.2 | 5.5 | 4.7 |
| | -10 | 9.1 | 8.7 | 7.8 | 7.0 | 6.2 | 5.5 | 4.8 |
| | -5 | 9.1 | 8.7 | 7.8 | 7.0 | 6.2 | 5.6 | 4.8 |
| | 0 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 5 | 9.2 | 8.8 | 7.9 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 10 | 8.1 | 7.7 | 6.9 | 6.1 | 5.4 | 4.8 | 4.0 |

TCG3_TO_2_-1_02

| Net Takeoff Climb Gradient, Final Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 3000 | -40 | 8.5 | 8.1 | 7.3 | 6.5 | 5.7 | 5.1 | 4.3 |
| | -30 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | -20 | 8.6 | 8.3 | 7.4 | 6.6 | 5.9 | 5.2 | 4.5 |
| | -10 | 8.7 | 8.3 | 7.5 | 6.7 | 5.9 | 5.3 | 4.5 |
| | -5 | 8.7 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 0 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 5 | 8.5 | 8.1 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 10 | 7.2 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 | 3.4 |
| 4000 | -40 | 8.2 | 7.8 | 7.0 | 6.2 | 5.5 | 4.8 | 4.1 |
| | -30 | 8.2 | 7.9 | 7.0 | 6.2 | 5.5 | 4.9 | 4.2 |
| | -20 | 8.3 | 7.9 | 7.1 | 6.3 | 5.6 | 4.9 | 4.2 |
| | -10 | 8.4 | 8.0 | 7.1 | 6.4 | 5.6 | 5.0 | 4.2 |
| | -5 | 8.4 | 8.0 | 7.1 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 0 | 8.4 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 5 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 10 | 6.3 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 |
| 5000 | -40 | 7.8 | 7.4 | 6.6 | 5.9 | 5.2 | 4.5 | 3.8 |
| | -30 | 7.9 | 7.5 | 6.7 | 5.9 | 5.2 | 4.6 | 3.9 |
| | -20 | 7.9 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 3.9 |
| | -10 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | -5 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | 0 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | 5 | 6.7 | 6.3 | 5.6 | 4.9 | 4.2 | 3.7 | 3.0 |
| | 10 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| 6000 | -40 | 7.5 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.6 |
| | -30 | 7.5 | 7.2 | 6.4 | 5.6 | 5.0 | 4.3 | 3.6 |
| | -20 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | -10 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | -5 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 0 | 7.1 | 6.7 | 6.0 | 5.2 | 4.6 | 4.0 | 3.3 |
| | 5 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | 2.4 |
| | 10 | 4.6 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | 1.5 |

TCG3_TO_2_3_02

**Net Takeoff Climb Gradient, Final Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection On, 140 KIAS**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 7000 | -40 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 |
| | -30 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | -20 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | -10 | 7.2 | 6.9 | 6.1 | 5.3 | 4.7 | 4.1 | 3.4 |
| | -5 | 7.2 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 | 3.4 |
| | 0 | 6.2 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 |
| | 5 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 | 1.8 |
| | 10 | 3.9 | 3.6 | 3.0 | 2.5 | 2.0 | **1.5** | **0.9** |
| 8000 | -40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | -30 | 6.9 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 |
| | -20 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | -10 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | -5 | 6.6 | 6.3 | 5.5 | 4.8 | 4.2 | 3.6 | 2.9 |
| | 0 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| | 5 | 4.2 | 4.0 | 3.3 | 2.8 | 2.3 | 1.8 | **1.2** |
| | 10 | 3.2 | 2.9 | 2.4 | 1.8 | **1.4** | **0.9** | **0.4** |
| 9000 | -40 | 6.5 | 6.2 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | -30 | 6.5 | 6.2 | 5.4 | 4.8 | 4.1 | 3.5 | 2.9 |
| | -20 | 6.5 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | -10 | 6.4 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.8 |
| | -5 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | 2.3 |
| | 0 | 4.6 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | **1.5** |
| | 5 | 3.5 | 3.3 | 2.7 | 2.2 | **1.7** | **1.2** | **0.7** |
| | 10 | 2.5 | 2.3 | **1.7** | **1.3** | **0.8** | **0.4** | |
| 10,000 | -40 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -30 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -20 | 6.1 | 5.8 | 5.0 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -10 | 6.1 | 5.8 | 5.0 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -5 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.4 | 1.8 |
| | 0 | 3.9 | 3.6 | 3.0 | 2.5 | 1.9 | **1.5** | **0.9** |
| | 5 | 2.8 | 2.6 | 2.0 | **1.5** | **1.1** | **0.6** | **0.2** |
| | 10 | **1.8** | **1.6** | **1.2** | **0.7** | **0.3** | | |

TCG3_TO_2_7_02

# Honda Aircraft Company



| Wind Corrected Enroute Climb Gradient [%] | | | | |
|---|---|---|---|---|
| **FLAPS UP, 140 [KIAS], Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | **◄ REF [0] ►** | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.5 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.0 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.9 | **2.0** | 2.1 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.7 |
| 2.8 | **3.0** | 3.1 | 3.2 | 3.3 |
| 3.2 | **3.5** | 3.6 | 3.7 | 3.9 |
| 3.6 | **4.0** | 4.1 | 4.3 | 4.4 |
| 4.1 | **4.5** | 4.7 | 4.8 | 5.0 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.6 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.1 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.7 |
| 5.9 | **6.5** | 6.7 | 7.0 | 7.3 |
| 6.3 | **7.0** | 7.3 | 7.5 | 7.8 |
| 6.8 | **7.5** | 7.8 | 8.1 | 8.4 |
| 7.2 | **8.0** | 8.3 | 8.6 | 9.0 |
| 7.7 | **8.5** | 8.8 | 9.2 | 9.5 |
| 8.1 | **9.0** | 9.3 | 9.7 | 10.1 |
| 8.6 | **9.5** | 9.9 | 10.3 | 10.7 |
| 9.0 | **10.0** | 10.4 | 10.8 | 11.2 |
| 9.4 | **10.5** | 10.9 | 11.3 | 11.8 |
| 9.9 | **11.0** | 11.4 | 11.9 | 12.4 |
| 10.3 | **11.5** | 11.9 | 12.4 | 12.9 |
| 10.8 | **12.0** | 12.5 | 13.0 | 13.5 |

ECGWC_UP_2_03

# TAKEOFF – FLAPS UP

## Max Takeoff Weight – Climb and Brake Energy Limited

Red shading on the takeoff tables indicates conditions where the airplane does not meet the climb requirements or exceeds the brake energy limit, but can be used for interpolation.

**Example:**

Ambient Conditions:

| | |
|---|---|
| Temperature | -10 °C |
| Airport Altitude | 7500 ft |
| Wind | 15 kts Headwind |
| Runway Gradient | +1.0 % |

Aircraft Configuration:

| | |
|---|---|
| Flaps | UP |
| Weight | 10600 lbs |

Bleed Setting:

| | |
|---|---|
| Ice Protection | On |

Using the Weight Limit Charts:

| | |
|---|---|
| BE Weight Limit 15kt Headwind | Not Limited |
| BE Weight Limit +1% Runway Gradient | Not Limited |

Using the Tables:

Uncorrected

- $V_1$ 126 KIAS
- $V_R$ 126 KIAS
- $V_2$ 131.5 KIAS
- Field Length 7642 ft
- Climb Gradient 4.5 %

Using the Tables: (continued)

Wind Correction:

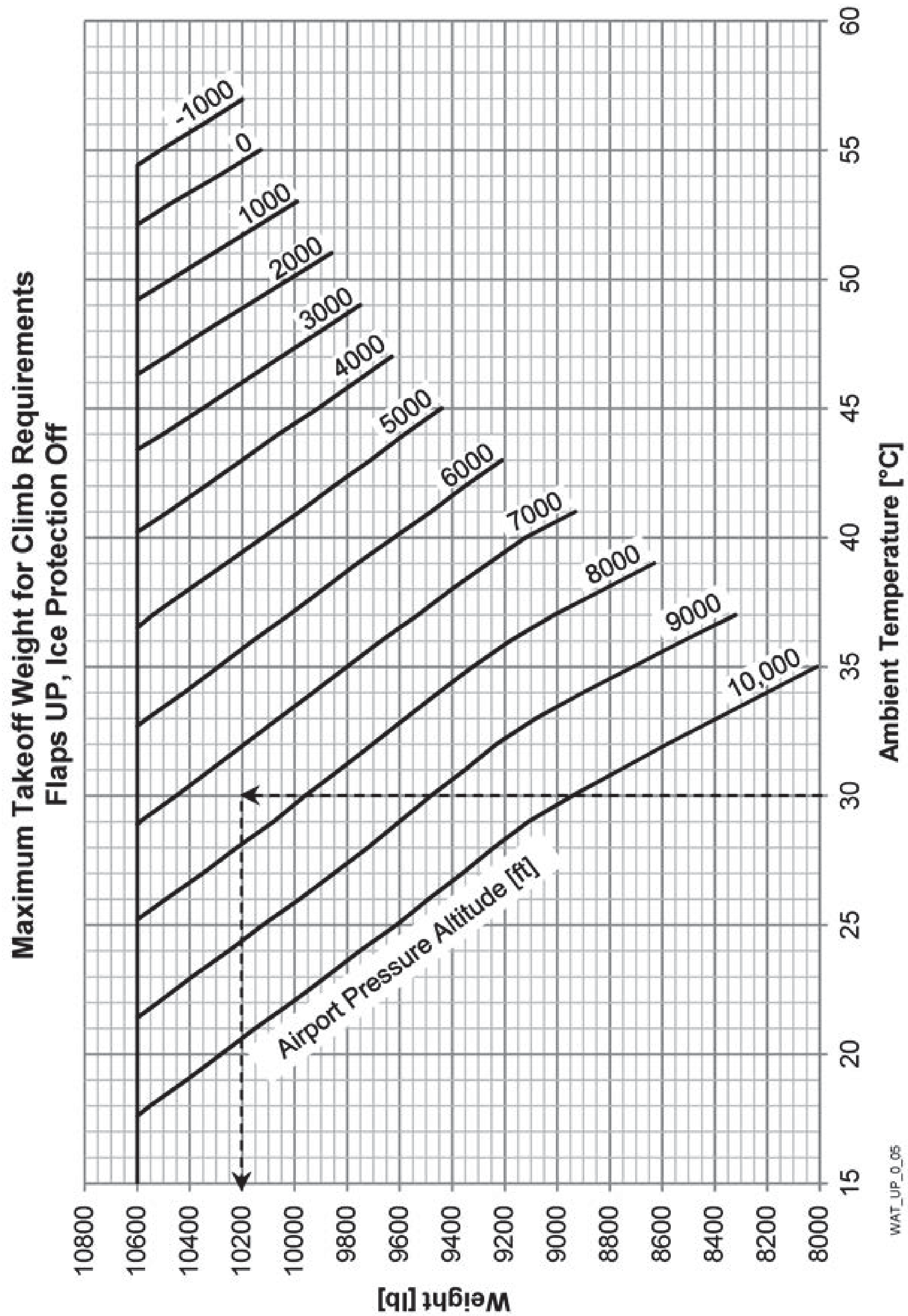
- $V_1$ 126 KIAS
- Field Length 7216 ft
- Climb Gradient 4.8 %

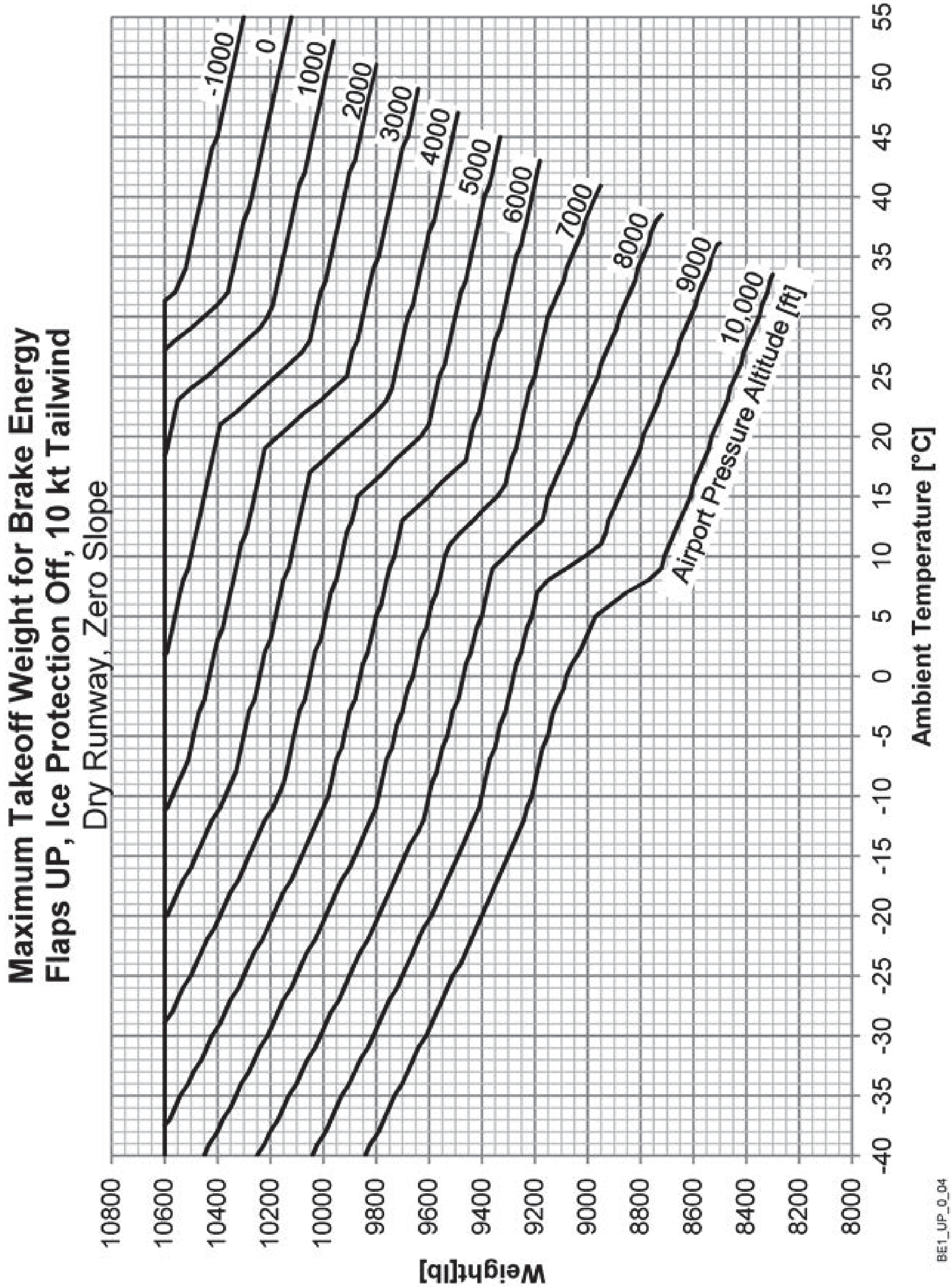
Slope Correction:

- $V_1$ 126 KIAS
- $V_2$ 130.5 KIAS
- Field Length 8249 ft

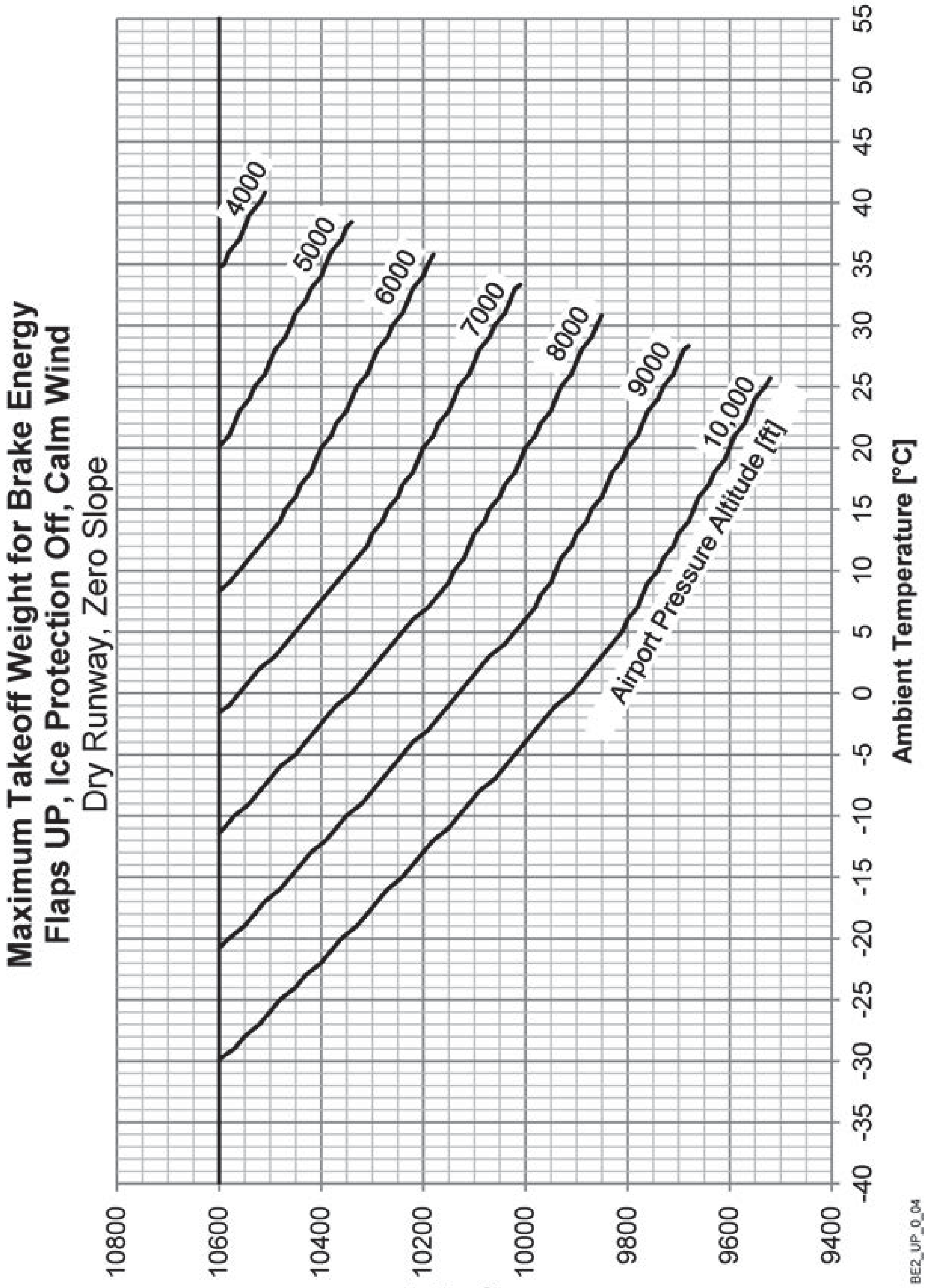
# Honda Aircraft Company



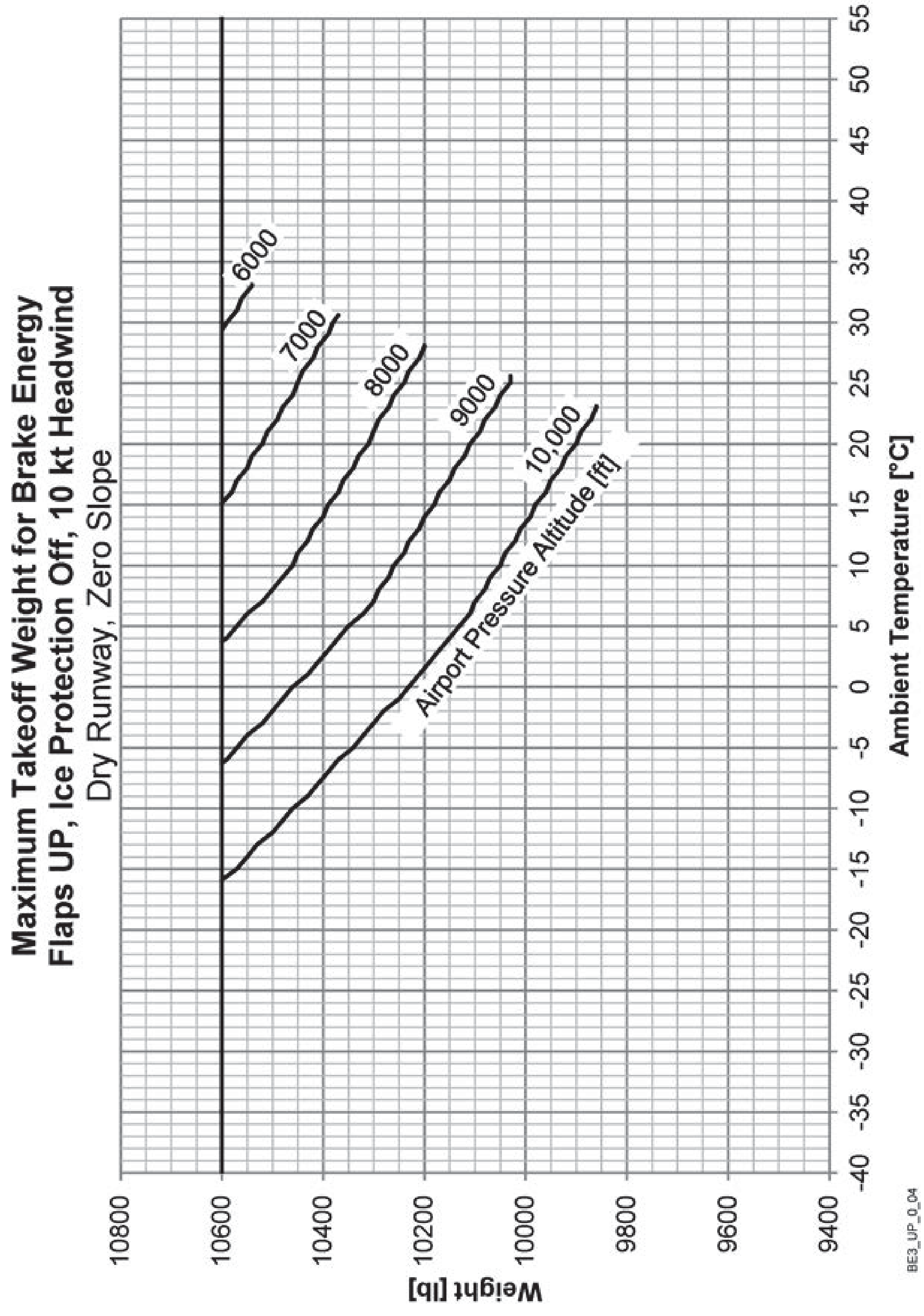


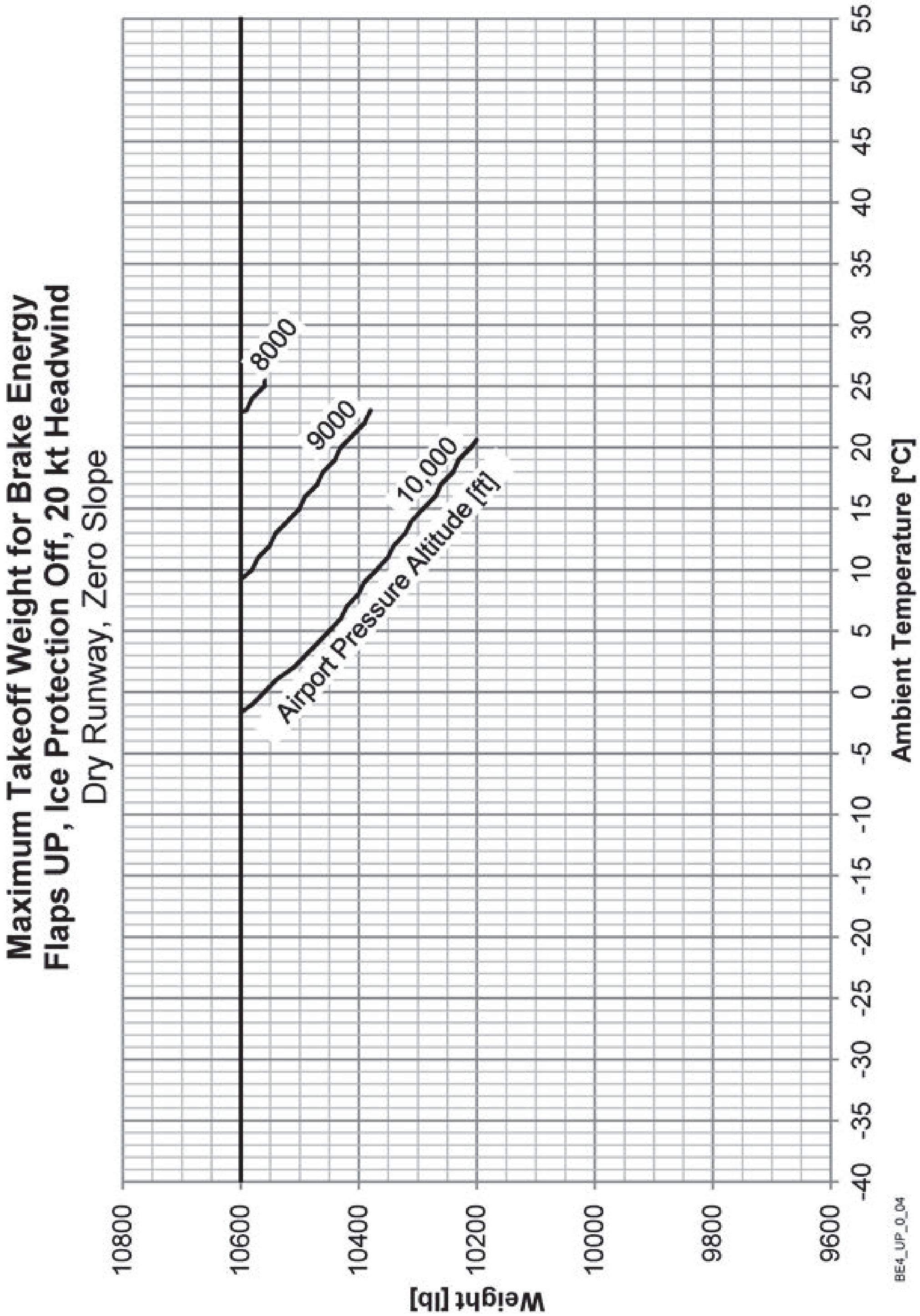


Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection Off, 10 kt Tailwind
Dry Runway, Zero Slope
-1000
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight[lb]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
8800
8600
8400
8200
8000
BE1_UP_0_04

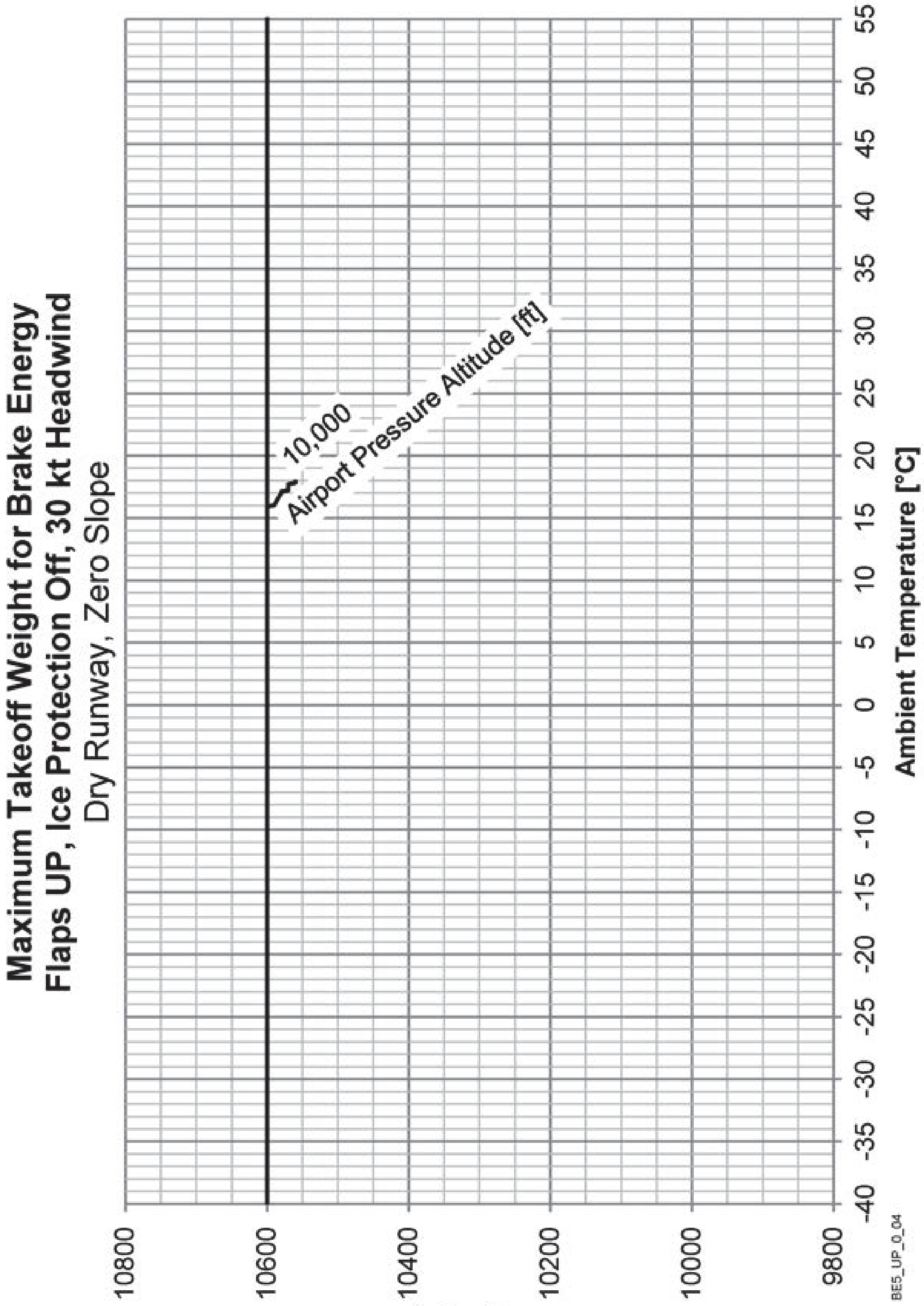


Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection Off, Calm Wind
Dry Runway, Zero Slope
4000
5000
6000
7000
8000
9000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
-40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55
Weight [lb]
10800 10600 10400 10200 10000 9800 9600 9400
BE2_UP_0_04


Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection Off, 10 kt Headwind
Dry Runway, Zero Slope
6000
7000
8000
9000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
BE3_UP_0_04



Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection Off, 20 kt Headwind
Dry Runway, Zero Slope
8000
9000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
-40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55
Weight [lb]
10800 10600 10400 10200 10000 9800 9600
BE4_UP_0_04



Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection Off, 30 kt Headwind
Dry Runway, Zero Slope
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
-40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55
Weight [lb]
10800 10600 10400 10200 10000 9800
BE5_UP_0_04

| Slope Corrected Maximum Takeoff Weight for Brake Energy [lb] | | | | |
|---|---|---|---|---|
| **Flaps UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 7440 | 7640 | **7800** | 7940 | 8083 |
| 7539 | 7739 | **7900** | 8042 | 8187 |
| 7637 | 7837 | **8000** | 8144 | 8290 |
| 7736 | 7936 | **8100** | 8246 | 8393 |
| 7834 | 8034 | **8200** | 8349 | 8497 |
| 7933 | 8133 | **8300** | 8451 | 8600 |
| 8031 | 8231 | **8400** | 8553 | 8703 |
| 8130 | 8330 | **8500** | 8655 | 8807 |
| 8229 | 8429 | **8600** | 8757 | 8910 |
| 8327 | 8527 | **8700** | 8859 | 9013 |
| 8426 | 8626 | **8800** | 8961 | 9117 |
| 8524 | 8724 | **8900** | 9064 | 9220 |
| 8623 | 8823 | **9000** | 9166 | 9323 |
| 8721 | 8921 | **9100** | 9268 | 9427 |
| 8820 | 9020 | **9200** | 9370 | 9530 |
| 8919 | 9119 | **9300** | 9472 | 9633 |
| 9017 | 9217 | **9400** | 9574 | 9737 |
| 9116 | 9316 | **9500** | 9676 | 9840 |
| 9214 | 9414 | **9600** | 9779 | 9943 |
| 9313 | 9513 | **9700** | 9881 | 10047 |
| 9411 | 9611 | **9800** | 9983 | 10150 |
| 9510 | 9710 | **9900** | 10085 | 10253 |
| 9609 | 9809 | **10000** | 10187 | 10357 |
| 9707 | 9907 | **10100** | 10289 | 10460 |
| 9806 | 10006 | **10200** | 10391 | 10563 |
| 9904 | 10104 | **10300** | 10494 | 10600 |
| 10003 | 10203 | **10400** | 10596 | 10600 |
| 10101 | 10301 | **10500** | 10600 | 10600 |
| 10200 | 10400 | **10600** | 10600 | 10600 |

BESC1_UP_0_04

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude -1000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 111 | 111 | 113 | 114 | 117 | 121 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 130 | 130 | 132 | 134 |
| | TOFL | 2736 | 2790 | 2923 | 3050 | 3269 | 3530 | 3898 |
| 15 | V1 | 109 | 110 | 112 | 113 | 116 | 119 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3210 | 3277 | 3439 | 3594 | 3858 | 4175 | 4565 |
| 25 | V1 | 109 | 110 | 111 | 113 | 116 | 119 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 130 | 131 | 133 |
| | TOFL | 3291 | 3360 | 3527 | 3687 | 3959 | 4285 | 4688 |
| 35 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3706 | 3776 | 3951 | 4120 | 4410 | 4901 | 5986 |
| 40 | V1 | 114 | 115 | 116 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 128 | 129 | 132 |
| | TOFL | 3982 | 4055 | 4232 | 4404 | 5006 | 5946 | 7055 |
| 45 | V1 | 116 | 116 | 118 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4281 | 4355 | 4624 | 5234 | 6102 | 7047 | 8169 |
| 50 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 4775 | 5053 | 5727 | 6371 | 7236 | 8194 | 9338 |
| 55 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 125 | 127 | 130 |
| | TOFL | 5985 | 6253 | 6900 | 7523 | 8391 | 9367 | 10541 |

TOFL_UP_0_-1_06

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps UP, Ice Protection Off, Altitude Sea Level**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 111 | 111 | 113 | 114 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2825 | 2881 | 3018 | 3150 | 3376 | 3647 | 4042 |
| 15 | V1 | 109 | 110 | 112 | 113 | 116 | 119 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3316 | 3385 | 3552 | 3711 | 3985 | 4312 | 4717 |
| 25 | V1 | 109 | 110 | 111 | 113 | 116 | 119 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3402 | 3473 | 3645 | 3810 | 4092 | 4430 | 4847 |
| 35 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3918 | 3992 | 4173 | 4349 | 4679 | 5477 | 6603 |
| 40 | V1 | 115 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4220 | 4295 | 4479 | 4779 | 5639 | 6599 | 7734 |
| 45 | V1 | 116 | 117 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4534 | 4649 | 5193 | 5864 | 6747 | 7717 | 8871 |
| 50 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 125 | 125 | 124 | 126 | 128 | 130 |
| | TOFL | 5444 | 5722 | 6396 | 7042 | 7925 | 8908 | 10088 |
| 55 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | **130** |
| | TOFL | 6683 | 6950 | 7600 | 8226 | 9116 | 10123 | **11340** |

TOFL_UP_0_0_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 1000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 111 | 112 | 113 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2966 | 3024 | 3165 | 3303 | 3538 | 3820 | 4408 |
| 15 | V1 | 110 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3480 | 3551 | 3723 | 3889 | 4175 | 4516 | 5018 |
| 25 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3653 | 3726 | 3903 | 4078 | 4373 | 4729 | 5359 |
| 30 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3915 | 3988 | 4174 | 4353 | 4659 | 5219 | 6359 |
| 35 | V1 | 114 | 114 | 116 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4201 | 4278 | 4466 | 4648 | 5311 | 6285 | 7435 |
| 40 | V1 | 116 | 116 | 118 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 129 | 131 |
| | TOFL | 4511 | 4589 | 4893 | 5528 | 6427 | 7409 | 8576 |
| 45 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5025 | 5314 | 6013 | 6681 | 7578 | 8574 | 9763 |
| 50 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6271 | 6548 | 7220 | 7866 | 8769 | 9785 | 11008 |

TOFL_UP_0_1_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 2000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 112 | 112 | 114 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3109 | 3168 | 3314 | 3459 | 3703 | 3996 | 4775 |
| 10 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3601 | 3673 | 3847 | 4019 | 4311 | 4661 | 5273 |
| 20 | V1 | 110 | 111 | 112 | 114 | 116 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3699 | 3773 | 3953 | 4131 | 4432 | 4793 | 5400 |
| 30 | V1 | 113 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4203 | 4281 | 4473 | 4659 | 5118 | 6060 | 7225 |
| 35 | V1 | 115 | 115 | 116 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4502 | 4582 | 4778 | 5211 | 6129 | 7125 | 8306 |
| 40 | V1 | 117 | 118 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 4847 | 5015 | 5650 | 6341 | 7255 | 8262 | 9463 |
| 45 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 125 | 127 | 130 |
| | TOFL | 5857 | 6144 | 6841 | 7508 | 8425 | 9450 | 10681 |
| 50 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 124 | 124 | 124 | 125 | 127 | **129** |
| | TOFL | 7120 | 7397 | 8069 | 8718 | 9645 | 10697 | **11968** |

TOFL_UP_0_2_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 3000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 112 | 113 | 114 | 115 | 118 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3261 | 3322 | 3475 | 3625 | 3879 | 4225 | 5166 |
| 10 | V1 | 111 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 127 | 128 | 130 | 133 |
| | TOFL | 3780 | 3854 | 4034 | 4215 | 4518 | 4884 | 5700 |
| 20 | V1 | 111 | 112 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3927 | 4003 | 4191 | 4377 | 4691 | 5078 | 5999 |
| 25 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4212 | 4292 | 4488 | 4677 | 5058 | 5885 | 7066 |
| 30 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4517 | 4598 | 4798 | 5104 | 5951 | 6959 | 8153 |
| 35 | V1 | 116 | 116 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 131 |
| | TOFL | 4830 | 4913 | 5370 | 6083 | 7014 | 8034 | 9248 |
| 40 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 125 | 125 | 124 | 126 | 128 | 130 |
| | TOFL | 5469 | 5767 | 6488 | 7178 | 8111 | 9149 | 10392 |
| 45 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | **130** |
| | TOFL | 6713 | 7000 | 7695 | 8364 | 9305 | 10365 | **11643** |

TOFL_UP_0_3_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 4000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 113 | 113 | 115 | 116 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3422 | 3486 | 3646 | 3801 | 4065 | 4555 | 5585 |
| 10 | V1 | 111 | 112 | 113 | 114 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3974 | 4051 | 4240 | 4427 | 4743 | 5190 | 6187 |
| 20 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 128 | 129 | 132 |
| | TOFL | 4224 | 4305 | 4504 | 4697 | 5028 | 5719 | 6916 |
| 25 | V1 | 114 | 114 | 115 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4533 | 4616 | 4819 | 5049 | 5784 | 6806 | 8016 |
| 30 | V1 | 115 | 116 | 118 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4855 | 4939 | 5281 | 5932 | 6877 | 7909 | 9137 |
| 35 | V1 | 118 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 126 | 125 | 125 | 124 | 126 | 128 | **130** |
| | TOFL | 5326 | 5557 | 6299 | 7008 | 7954 | 9001 | **10254** |
| 40 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | **130** |
| | TOFL | 6404 | 6701 | 7420 | 8110 | 9063 | 10131 | **11417** |
| 45 | V1 | 119 | 119 | 119 | 119 | 121 | **123** | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | **123** | **126** |
| | V2 | 124 | 124 | 124 | 123 | 125 | **127** | **129** |
| | TOFL | 7599 | 7886 | 8584 | 9258 | 10225 | **11324** | **12656** |

TOFL_UP_0_4_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 5000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 113 | 114 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3591 | 3658 | 3824 | 3985 | 4261 | 4963 | 6016 |
| 5 | V1 | 112 | 112 | 114 | 115 | 117 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 4120 | 4198 | 4394 | 4584 | 4908 | 5472 | 6617 |
| 15 | V1 | 112 | 112 | 114 | 115 | 117 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 4249 | 4330 | 4532 | 4729 | 5064 | 5649 | 6806 |
| 25 | V1 | 115 | 115 | 117 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4878 | 4965 | 5230 | 5764 | 6725 | 7771 | 9015 |
| 30 | V1 | 117 | 118 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 125 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5290 | 5466 | 6158 | 6883 | 7845 | 8908 | 10178 |
| 35 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6208 | 6513 | 7250 | 7957 | 8925 | 10006 | 11306 |
| 40 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 123 | 125 | 127 | 129 |
| | TOFL | 7389 | 7684 | 8402 | 9094 | 10073 | 11182 | 12524 |
| 45 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 123 | 123 | 124 | 126 | 129 |
| | TOFL | 8595 | 8883 | 9585 | 10266 | 11264 | 12409 | 13803 |

TOFL_UP_0_5_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind<br>Flaps UP, Ice Protection Off, Altitude 6000 feet | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 113 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3768 | 3839 | 4011 | 4177 | 4530 | 5371 | 6449 |
| 0 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4270 | 4352 | 4552 | 4746 | 5091 | 5859 | 7056 |
| 10 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4410 | 4495 | 4703 | 4903 | 5269 | 6047 | 7273 |
| 20 | V1 | 114 | 115 | 116 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4899 | 4987 | 5203 | 5610 | 6564 | 7624 | 8884 |
| 25 | V1 | 116 | 117 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5242 | 5405 | 5965 | 6709 | 7686 | 8761 | 10044 |
| 30 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6051 | 6364 | 7119 | 7842 | 8825 | 9919 | 11234 |
| 35 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 124 | 125 | 127 | 129 |
| | TOFL | 7220 | 7522 | 8258 | 8965 | 9958 | 11079 | 12433 |
| 40 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 123 | 123 | 124 | 126 | 129 |
| | TOFL | 8419 | 8714 | 9433 | 10129 | 11140 | 12296 | 13702 |

TOFL_UP_0_6_06

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 7000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3954 | 4027 | 4206 | 4379 | 4853 | 5789 | 6893 |
| 0 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 131 |
| | TOFL | 4502 | 4587 | 4795 | 4997 | 5471 | 6392 | 7619 |
| 10 | V1 | 113 | 113 | 114 | 115 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4653 | 4741 | 4956 | 5165 | 5669 | 6610 | 7866 |
| 15 | V1 | 114 | 114 | 115 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 128 | 131 |
| | TOFL | 4924 | 5014 | 5233 | 5570 | 6422 | 7498 | 8774 |
| 20 | V1 | 115 | 116 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5266 | 5358 | 5800 | 6538 | 7532 | 8621 | 9920 |
| 25 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 125 | 127 | 130 |
| | TOFL | 5871 | 6179 | 6954 | 7695 | 8693 | 9800 | 11129 |
| 30 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 124 | 124 | 124 | 125 | 127 | 129 |
| | TOFL | 7058 | 7369 | 8122 | 8845 | 9853 | 10987 | 12355 |
| 35 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 123 | 123 | 124 | 127 | 129 |
| | TOFL | 8239 | 8542 | 9278 | 9990 | 11014 | 12182 | 13599 |

TOFL_UP_0_7_06

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps UP, Ice Protection Off, Altitude 8000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 114 | 115 | 116 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4150 | 4225 | 4410 | 4590 | 5269 | 6229 | 7362 |
| 0 | V1 | 113 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4750 | 4839 | 5054 | 5264 | 5903 | 6968 | 8228 |
| 10 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 129 | 131 |
| | TOFL | 4948 | 5040 | 5263 | 5527 | 6270 | 7360 | 8651 |
| 15 | V1 | 115 | 115 | 118 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5300 | 5394 | 5771 | 6412 | 7421 | 8524 | 9839 |
| 20 | V1 | 118 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 125 | 128 | 130 |
| | TOFL | 5810 | 6002 | 6778 | 7537 | 8550 | 9671 | 11016 |
| 25 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 124 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6877 | 7196 | 7968 | 8708 | 9731 | 10880 | 12264 |
| 30 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 123 | 125 | 127 | 129 |
| | TOFL | 8092 | 8402 | 9155 | 9883 | 10921 | 12102 | 13535 |
| 35 | V1 | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | VR | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | V2 | 122 | 122 | 122 | 122 | 123 | 125 | 128 |
| | TOFL | 9308 | 9612 | 10353 | 11073 | 12133 | 13354 | 14846 |

TOFL_UP_0_8_07

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection Off, Altitude 9000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4354 | 4432 | 4624 | 4891 | 5693 | 6675 | 7838 |
| 0 | V1 | 114 | 114 | 115 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 128 | 131 |
| | TOFL | 5003 | 5095 | 5318 | 5636 | 6449 | 7541 | 8836 |
| 10 | V1 | 115 | 115 | 117 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 5333 | 5428 | 5738 | 6273 | 7297 | 8413 | 9742 |
| 15 | V1 | 117 | 118 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 126 | 128 | 130 |
| | TOFL | 5788 | 5978 | 6658 | 7434 | 8462 | 9597 | 10955 |
| 20 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6698 | 7025 | 7817 | 8575 | 9613 | 10773 | 12169 |
| 25 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 123 | 125 | 127 | 129 |
| | TOFL | 7935 | 8253 | 9025 | 9768 | 10821 | 12014 | 13458 |
| 30 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 123 | 123 | 123 | 124 | 126 | 129 |
| | TOFL | 9163 | 9474 | 10233 | 10968 | 12042 | 13275 | 14779 |
| 35 | V1 | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | VR | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | V2 | 122 | 122 | 122 | 121 | 123 | 125 | 127 |
| | TOFL | 10453 | 10759 | 11508 | 12240 | 13344 | 14630 | 16208 |

TOFL_UP_0_9_07

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection Off, Altitude 10,000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 115 | 115 | 116 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4577 | 4659 | 4859 | 5238 | 6159 | 7164 | 8355 |
| -5 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 5181 | 5274 | 5503 | 5931 | 6890 | 7995 | 9308 |
| 5 | V1 | 114 | 115 | 115 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 131 |
| | TOFL | 5361 | 5457 | 5695 | 6158 | 7151 | 8282 | 9626 |
| 10 | V1 | 116 | 117 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 125 | 124 | 126 | 128 | 130 |
| | TOFL | 5780 | 5977 | 6568 | 7361 | 8404 | 9553 | 10928 |
| 15 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6561 | 6896 | 7706 | 8481 | 9534 | 10709 | 12121 |
| 20 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 123 | 125 | 127 | 129 |
| | TOFL | 7774 | 8100 | 8890 | 9651 | 10718 | 11926 | 13386 |
| 25 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 123 | 123 | 123 | 124 | 126 | 129 |
| | TOFL | 9056 | 9374 | 10149 | 10900 | 11988 | 13234 | 14752 |
| 30 | V1 | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | VR | 118 | 118 | 118 | 118 | 120 | 122 | 125 |
| | V2 | 122 | 122 | 122 | 121 | 123 | 125 | 127 |
| | TOFL | 10315 | 10628 | 11395 | 12141 | 13258 | 14552 | 16140 |

TOFL_UP_0_10_07

| Wind Corrected V1 [KIAS] | | |
|---|---|---|
| **FLAPS UP<br>Ice Protection Off** | | |
| Tailwind | | Headwind |
| 10 | ◄ REF [0] ► | 30 |
| 108 | **109** | 111 |
| 109 | **110** | 112 |
| 110 | **111** | 113 |
| 111 | **112** | 114 |
| 112 | **113** | 114 |
| 113 | **114** | 115 |
| 114 | **115** | 116 |
| 115 | **116** | 117 |
| 116 | **117** | 118 |
| 117 | **118** | 119 |
| 118 | **119** | 120 |
| 119 | **120** | 121 |
| 120 | **121** | 122 |
| 121 | **122** | 123 |
| 122 | **123** | 124 |
| 123 | **124** | 125 |
| 124 | **125** | 126 |
| 125 | **126** | 126 |

V1WC_UP_0_04

| Slope Corrected V1 [KIAS] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | **◄ REF [0] ►** | 1 | 2 |
| 105 | 106 | **108** | 110 | 113 |
| 106 | 107 | **109** | 111 | 114 |
| 107 | 108 | **110** | 112 | 114 |
| 108 | 109 | **111** | 113 | 115 |
| 109 | 110 | **112** | 114 | 116 |
| 110 | 111 | **113** | 115 | 116 |
| 110 | 112 | **114** | 116 | 117 |
| 111 | 113 | **115** | 117 | 118 |
| 112 | 114 | **116** | 117 | 119 |
| 113 | 115 | **117** | 118 | 119 |
| 114 | 117 | **118** | 119 | 120 |
| 115 | 118 | **119** | 120 | 121 |
| 116 | 119 | **120** | 121 | 121 |
| 117 | 120 | **121** | 122 | 122 |
| 118 | 121 | **122** | 123 | 123 |
| 119 | 122 | **123** | 124 | 123 |
| 120 | 123 | **124** | 124 | 124 |
| 121 | 124 | **125** | 125 | 125 |
| 122 | 125 | **126** | 126 | 126 |

V1SC_UP_0_04

## Takeoff Rotation Speed ($V_R$) Slope Correction, Ice Protection Off

**NOTE** $V_R$ with flaps UP and Ice Protection Off does not require slope correction.

| Slope Corrected V2 [KIAS] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | **◄ REF [0] ►** | 1 | 2 |
| 124 | 124 | **123** | 122 | 122 |
| 125 | 125 | **124** | 123 | 123 |
| 126 | 126 | **125** | 124 | 124 |
| 127 | 127 | **126** | 125 | 125 |
| 128 | 128 | **127** | 126 | 126 |
| 129 | 129 | **128** | 127 | 127 |
| 130 | 130 | **129** | 128 | 128 |
| 131 | 131 | **130** | 129 | 129 |
| 132 | 132 | **131** | 130 | 130 |
| 133 | 133 | **132** | 131 | 131 |
| 134 | 134 | **133** | 132 | 132 |
| 135 | 135 | **134** | 133 | 133 |

V2SC_UP_0_05

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 3244 | **2700** | 2538 | 2396 | 2274 |
| 3352 | **2800** | 2635 | 2491 | 2366 |
| 3461 | **2900** | 2733 | 2585 | 2458 |
| 3570 | **3000** | 2830 | 2680 | 2550 |
| 3679 | **3100** | 2927 | 2775 | 2642 |
| 3788 | **3200** | 3025 | 2869 | 2734 |
| 3896 | **3300** | 3122 | 2964 | 2826 |
| 4005 | **3400** | 3220 | 3058 | 2918 |
| 4114 | **3500** | 3317 | 3153 | 3010 |
| 4223 | **3600** | 3414 | 3248 | 3102 |
| 4331 | **3700** | 3512 | 3342 | 3194 |
| 4440 | **3800** | 3609 | 3437 | 3286 |
| 4549 | **3900** | 3706 | 3532 | 3378 |
| 4658 | **4000** | 3804 | 3626 | 3470 |
| 4766 | **4100** | 3901 | 3721 | 3562 |
| 4875 | **4200** | 3999 | 3815 | 3654 |
| 4984 | **4300** | 4096 | 3910 | 3746 |
| 5093 | **4400** | 4193 | 4005 | 3838 |
| 5202 | **4500** | 4291 | 4099 | 3930 |
| 5310 | **4600** | 4388 | 4194 | 4022 |
| 5419 | **4700** | 4486 | 4288 | 4114 |
| 5528 | **4800** | 4583 | 4383 | 4206 |
| 5637 | **4900** | 4680 | 4478 | 4298 |
| 5745 | **5000** | 4778 | 4572 | 4390 |
| 5854 | **5100** | 4875 | 4667 | 4482 |
| 5963 | **5200** | 4972 | 4762 | 4574 |
| 6072 | **5300** | 5070 | 4856 | 4666 |
| 6180 | **5400** | 5167 | 4951 | 4758 |
| 6289 | **5500** | 5265 | 5045 | 4850 |
| 6398 | **5600** | 5362 | 5140 | 4942 |
| 6507 | **5700** | 5459 | 5235 | 5034 |
| 6616 | **5800** | 5557 | 5329 | 5126 |
| 6724 | **5900** | 5654 | 5424 | 5218 |
| 6833 | **6000** | 5752 | 5518 | 5310 |
| 6942 | **6100** | 5849 | 5613 | 5402 |
| 7051 | **6200** | 5946 | 5708 | 5494 |

TOWC1_UP_0_02

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection Off | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 7051 | **6200** | 5946 | 5708 | 5494 |
| 7159 | **6300** | 6044 | 5802 | 5586 |
| 7268 | **6400** | 6141 | 5897 | 5678 |
| 7377 | **6500** | 6238 | 5992 | 5770 |
| 7486 | **6600** | 6336 | 6086 | 5862 |
| 7594 | **6700** | 6433 | 6181 | 5954 |
| 7703 | **6800** | 6531 | 6275 | 6046 |
| 7812 | **6900** | 6628 | 6370 | 6138 |
| 7921 | **7000** | 6725 | 6465 | 6230 |
| 8030 | **7100** | 6823 | 6559 | 6322 |
| 8138 | **7200** | 6920 | 6654 | 6414 |
| 8247 | **7300** | 7018 | 6748 | 6506 |
| 8356 | **7400** | 7115 | 6843 | 6598 |
| 8465 | **7500** | 7212 | 6938 | 6690 |
| 8573 | **7600** | 7310 | 7032 | 6782 |
| 8682 | **7700** | 7407 | 7127 | 6874 |
| 8791 | **7800** | 7504 | 7222 | 6966 |
| 8900 | **7900** | 7602 | 7316 | 7058 |
| 9008 | **8000** | 7699 | 7411 | 7150 |
| 9117 | **8100** | 7797 | 7505 | 7242 |
| 9226 | **8200** | 7894 | 7600 | 7334 |
| 9335 | **8300** | 7991 | 7695 | 7426 |
| 9444 | **8400** | 8089 | 7789 | 7518 |
| 9552 | **8500** | 8186 | 7884 | 7610 |
| 9661 | **8600** | 8284 | 7978 | 7702 |
| 9770 | **8700** | 8381 | 8073 | 7794 |
| 9879 | **8800** | 8478 | 8168 | 7886 |
| 9987 | **8900** | 8576 | 8262 | 7978 |
| 10096 | **9000** | 8673 | 8357 | 8070 |
| 10205 | **9100** | 8770 | 8452 | 8162 |
| 10314 | **9200** | 8868 | 8546 | 8254 |
| 10422 | **9300** | 8965 | 8641 | 8346 |
| 10531 | **9400** | 9063 | 8735 | 8438 |
| 10640 | **9500** | 9160 | 8830 | 8530 |
| 10749 | **9600** | 9257 | 8925 | 8622 |
| 10858 | **9700** | 9355 | 9019 | 8714 |

TOWC2_UP_0_02

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 10858 | **9700** | 9355 | 9019 | 8714 |
| 10966 | **9800** | 9452 | 9114 | 8806 |
| 11075 | **9900** | 9550 | 9208 | 8898 |
| 11184 | **10000** | 9647 | 9303 | 8990 |
| 11293 | **10100** | 9744 | 9398 | 9082 |
| 11401 | **10200** | 9842 | 9492 | 9174 |
| 11510 | **10300** | 9939 | 9587 | 9266 |
| 11619 | **10400** | 10036 | 9682 | 9358 |
| 11728 | **10500** | 10134 | 9776 | 9450 |
| 11836 | **10600** | 10231 | 9871 | 9542 |
| 11945 | **10700** | 10329 | 9965 | 9634 |
| 12054 | **10800** | 10426 | 10060 | 9726 |
| 12163 | **10900** | 10523 | 10155 | 9818 |
| 12272 | **11000** | 10621 | 10249 | 9910 |
| 12380 | **11100** | 10718 | 10344 | 10002 |
| 12489 | **11200** | 10816 | 10438 | 10094 |
| 12598 | **11300** | 10913 | 10533 | 10186 |
| 12707 | **11400** | 11010 | 10628 | 10278 |
| 12815 | **11500** | 11108 | 10722 | 10370 |
| 12924 | **11600** | 11205 | 10817 | 10462 |
| 13033 | **11700** | 11302 | 10912 | 10554 |
| 13142 | **11800** | 11400 | 11006 | 10646 |
| 13250 | **11900** | 11497 | 11101 | 10738 |
| 13359 | **12000** | 11595 | 11195 | 10830 |
| 13468 | **12100** | 11692 | 11290 | 10922 |
| 13577 | **12200** | 11789 | 11385 | 11014 |
| 13686 | **12300** | 11887 | 11479 | 11106 |
| 13794 | **12400** | 11984 | 11574 | 11198 |
| 13903 | **12500** | 12082 | 11668 | 11290 |
| 14012 | **12600** | 12179 | 11763 | 11382 |
| 14121 | **12700** | 12276 | 11858 | 11474 |
| 14229 | **12800** | 12374 | 11952 | 11566 |
| 14338 | **12900** | 12471 | 12047 | 11658 |
| 14447 | **13000** | 12568 | 12142 | 11750 |
| 14556 | **13100** | 12666 | 12236 | 11842 |
| 14664 | **13200** | 12763 | 12331 | 11934 |

TOWC3_UP_0_02

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 14664 | **13200** | 12763 | 12331 | 11934 |
| 14773 | **13300** | 12861 | 12425 | 12026 |
| 14882 | **13400** | 12958 | 12520 | 12118 |
| 14991 | **13500** | 13055 | 12615 | 12210 |
| 15100 | **13600** | 13153 | 12709 | 12302 |
| 15208 | **13700** | 13250 | 12804 | 12394 |
| 15317 | **13800** | 13348 | 12898 | 12486 |
| 15426 | **13900** | 13445 | 12993 | 12578 |

TOWC4_UP_0_02

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection Off | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 2200 | 2200 | **2200** | 2237 | 2273 |
| 2300 | 2300 | **2300** | 2338 | 2377 |
| 2400 | 2400 | **2400** | 2440 | 2480 |
| 2500 | 2500 | **2500** | 2542 | 2583 |
| 2600 | 2600 | **2600** | 2643 | 2687 |
| 2700 | 2700 | **2700** | 2745 | 2790 |
| 2800 | 2800 | **2800** | 2847 | 2893 |
| 2900 | 2900 | **2900** | 2948 | 2997 |
| 3000 | 3000 | **3000** | 3050 | 3100 |
| 3109 | 3109 | **3100** | 3197 | 3303 |
| 3219 | 3219 | **3200** | 3344 | 3506 |
| 3328 | 3328 | **3300** | 3492 | 3708 |
| 3422 | 3426 | **3400** | 3639 | 3911 |
| 3505 | 3516 | **3500** | 3786 | 4114 |
| 3588 | 3606 | **3600** | 3933 | 4317 |
| 3671 | 3697 | **3700** | 4080 | 4520 |
| 3755 | 3787 | **3800** | 4227 | 4723 |
| 3838 | 3877 | **3900** | 4375 | 4925 |
| 3921 | 3967 | **4000** | 4522 | 5128 |
| 4004 | 4057 | **4100** | 4669 | 5331 |
| 4088 | 4148 | **4200** | 4816 | 5534 |
| 4171 | 4238 | **4300** | 4963 | 5737 |
| 4254 | 4328 | **4400** | 5111 | 5939 |
| 4337 | 4418 | **4500** | 5254 | 6134 |
| 4421 | 4509 | **4600** | 5369 | 6256 |
| 4504 | 4599 | **4700** | 5484 | 6378 |
| 4587 | 4689 | **4800** | 5599 | 6500 |
| 4670 | 4779 | **4900** | 5714 | 6622 |
| 4754 | 4869 | **5000** | 5828 | 6744 |
| 4837 | 4960 | **5100** | 5943 | 6866 |
| 4920 | 5050 | **5200** | 6058 | 6988 |
| 5003 | 5140 | **5300** | 6173 | 7110 |
| 5087 | 5230 | **5400** | 6287 | 7232 |
| 5170 | 5320 | **5500** | 6402 | 7354 |
| 5253 | 5411 | **5600** | 6517 | 7476 |
| 5336 | 5501 | **5700** | 6632 | 7598 |

TOSC1_UP_0_02

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 5336 | 5501 | **5700** | 6632 | 7598 |
| 5417 | 5588 | **5800** | 6747 | 7720 |
| 5476 | 5648 | **5900** | 6861 | 7842 |
| 5535 | 5707 | **6000** | 6966 | 7964 |
| 5594 | 5766 | **6100** | 7069 | 8086 |
| 5653 | 5825 | **6200** | 7171 | 8208 |
| 5712 | 5885 | **6300** | 7274 | 8330 |
| 5771 | 5944 | **6400** | 7377 | 8443 |
| 5830 | 6003 | **6500** | 7479 | 8555 |
| 5889 | 6062 | **6600** | 7582 | 8668 |
| 5948 | 6122 | **6700** | 7684 | 8780 |
| 6006 | 6181 | **6800** | 7787 | 8893 |
| 6065 | 6240 | **6900** | 7890 | 9005 |
| 6124 | 6299 | **7000** | 7992 | 9118 |
| 6183 | 6359 | **7100** | 8095 | 9230 |
| 6242 | 6418 | **7200** | 8197 | 9343 |
| 6301 | 6477 | **7300** | 8300 | 9455 |
| 6360 | 6537 | **7400** | 8403 | 9567 |
| 6419 | 6596 | **7500** | 8507 | 9672 |
| 6478 | 6655 | **7600** | 8611 | 9778 |
| 6537 | 6714 | **7700** | 8715 | 9883 |
| 6596 | 6774 | **7800** | 8820 | 9989 |
| 6655 | 6833 | **7900** | 8924 | 10095 |
| 6713 | 6935 | **8000** | 9028 | 10200 |
| 6772 | 7041 | **8100** | 9132 | 10306 |
| 6831 | 7146 | **8200** | 9237 | 10411 |
| 6890 | 7252 | **8300** | 9341 | 10517 |
| 6949 | 7358 | **8400** | 9445 | 10622 |
| 7008 | 7463 | **8500** | 9550 | 10728 |
| 7067 | 7569 | **8600** | 9654 | 10833 |
| 7126 | 7674 | **8700** | 9758 | 10939 |
| 7185 | 7780 | **8800** | 9863 | 11045 |
| 7244 | 7882 | **8900** | 9967 | 11150 |
| 7303 | 7976 | **9000** | 10071 | 11256 |
| 7361 | 8071 | **9100** | 10175 | 11361 |
| 7420 | 8165 | **9200** | 10280 | 11467 |

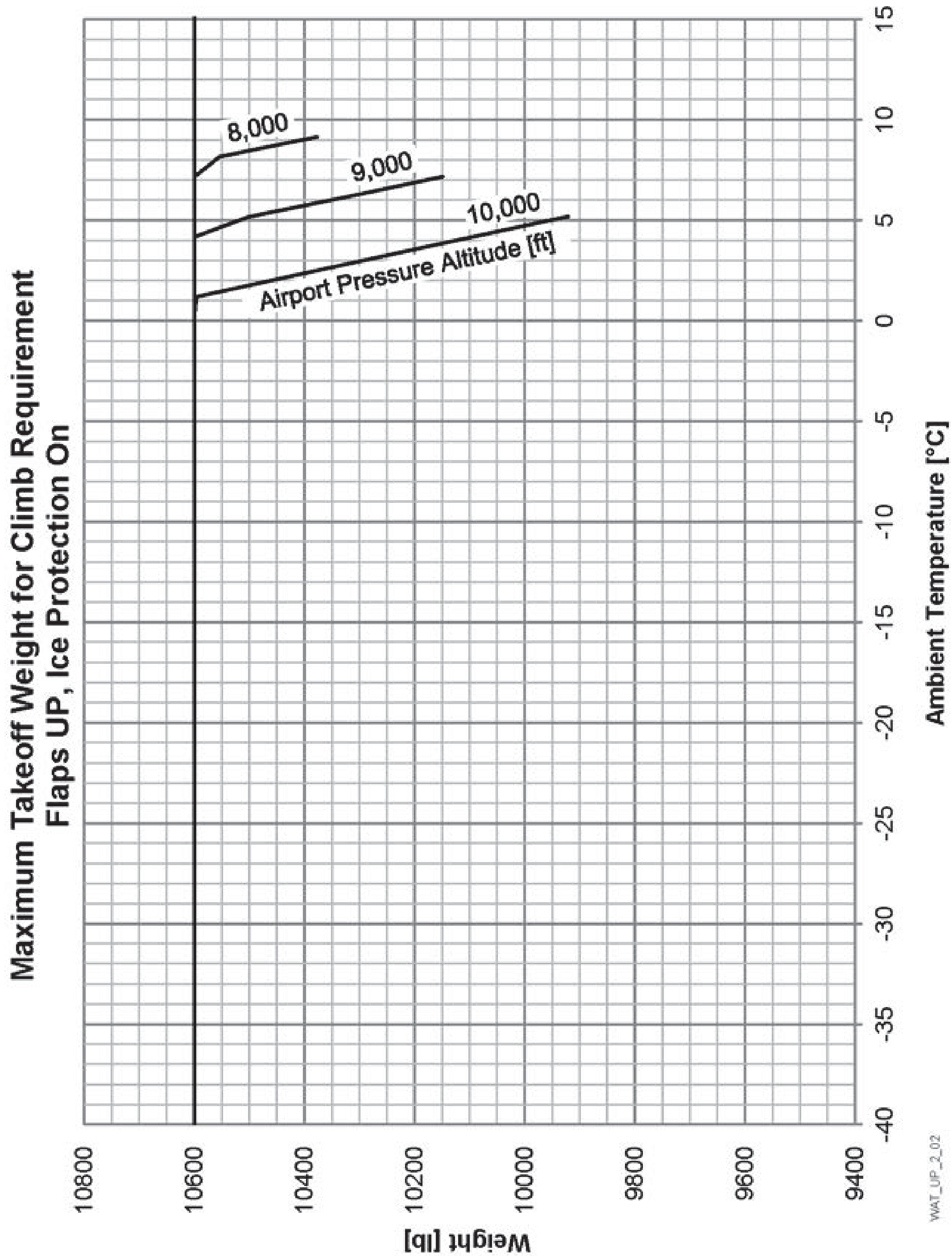
TOSC2_UP_0_02

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 7420 | 8165 | **9200** | 10280 | 11467 |
| 7479 | 8259 | **9300** | 10384 | 11572 |
| 7538 | 8353 | **9400** | 10488 | 11678 |
| 7597 | 8447 | **9500** | 10593 | 11783 |
| 7656 | 8541 | **9600** | 10697 | 11889 |
| 7715 | 8635 | **9700** | 10801 | 11995 |
| 7774 | 8729 | **9800** | 10905 | 12100 |
| 7833 | 8823 | **9900** | 11010 | 12206 |
| 7892 | 8918 | **10000** | 11114 | 12311 |
| 7951 | 9012 | **10100** | 11218 | 12417 |
| 8010 | 9106 | **10200** | 11323 | 12522 |
| 8068 | 9200 | **10300** | 11427 | 12628 |
| 8127 | 9294 | **10400** | 11531 | 12733 |
| 8186 | 9388 | **10500** | 11636 | 12839 |
| 8245 | 9482 | **10600** | 11740 | 12944 |
| 8304 | 9576 | **10700** | 11844 | 13050 |
| 8363 | 9671 | **10800** | 11948 | 13156 |
| 8422 | 9765 | **10900** | 12053 | 13261 |
| 8481 | 9859 | **11000** | 12157 | 13367 |
| 8540 | 9953 | **11100** | 12261 | 13472 |
| 8599 | 10047 | **11200** | 12366 | 13578 |
| 8658 | 10141 | **11300** | 12470 | 13683 |
| 8717 | 10235 | **11400** | 12574 | 13789 |
| 8775 | 10329 | **11500** | 12679 | 13894 |
| 8834 | 10424 | **11600** | 12783 | 14000 |
| 8893 | 10518 | **11700** | 12887 | 14106 |
| 8952 | 10612 | **11800** | 12991 | 14211 |
| 9011 | 10706 | **11900** | 13096 | 14317 |
| 9070 | 10800 | **12000** | 13200 | 14422 |
| 9129 | 10894 | **12100** | 13304 | 14528 |
| 9188 | 10988 | **12200** | 13409 | 14633 |
| 9247 | 11082 | **12300** | 13513 | 14739 |
| 9306 | 11176 | **12400** | 13617 | 14844 |
| 9365 | 11271 | **12500** | 13721 | 14950 |
| 9423 | 11365 | **12600** | 13826 | 15056 |
| 9482 | 11459 | **12700** | 13930 | 15161 |

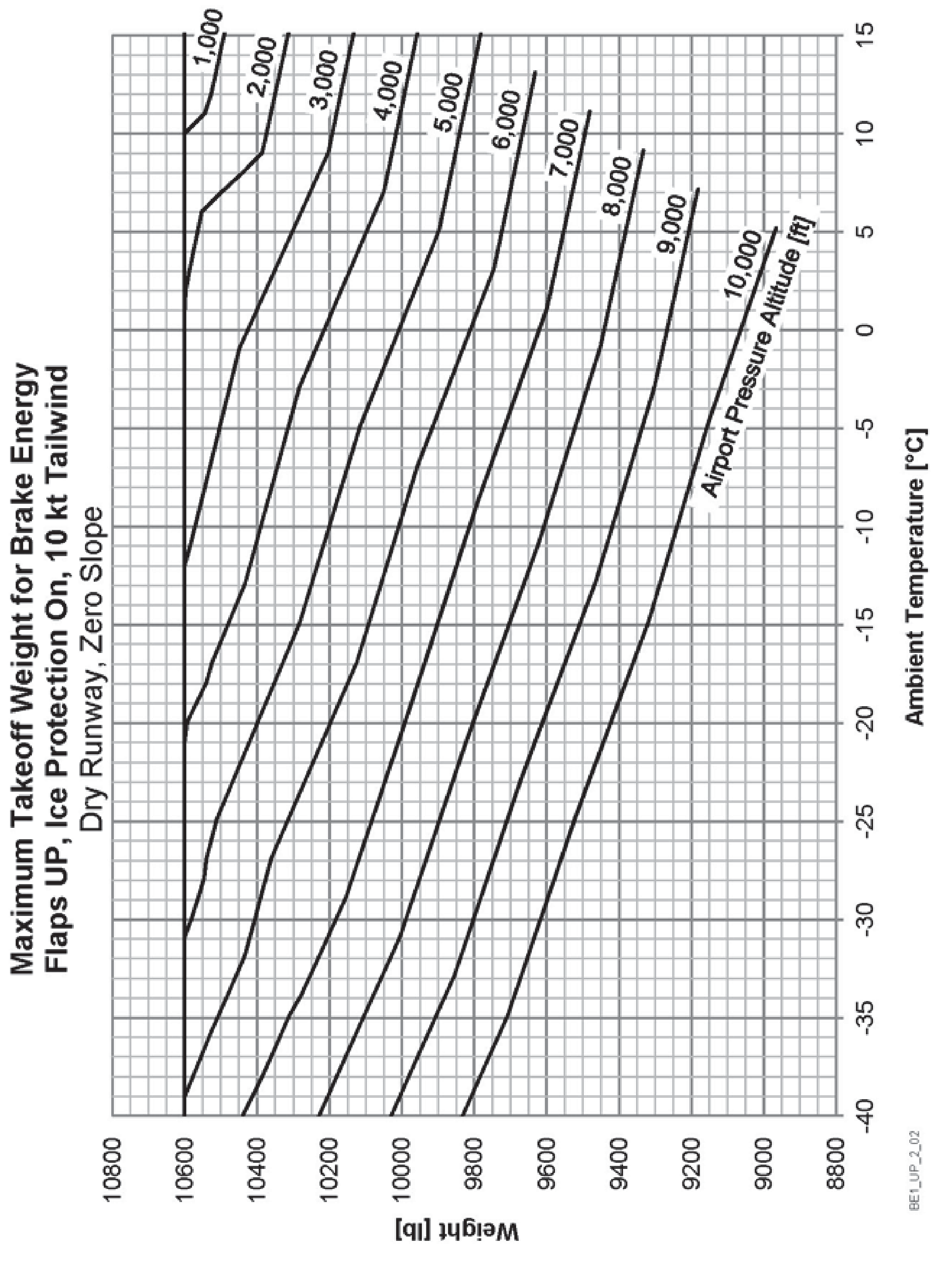
TOSC3_UP_0_02

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection Off** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 9482 | 11459 | **12700** | 13930 | 15161 |
| 9541 | 11553 | **12800** | 14034 | 15267 |
| 9600 | 11647 | **12900** | 14139 | 15372 |
| 9659 | 11741 | **13000** | 14243 | 15478 |
| 9718 | 11835 | **13100** | 14347 | 15583 |
| 9777 | 11929 | **13200** | 14452 | 15689 |
| 9836 | 12024 | **13300** | 14556 | 15794 |
| 9895 | 12118 | **13400** | 14660 | 15900 |
| 9954 | 12212 | **13500** | 14764 | 16005 |
| 10013 | 12306 | **13600** | 14869 | 16111 |
| 10072 | 12400 | **13700** | 14973 | 16217 |
| 10130 | 12494 | **13800** | 15077 | 16322 |
| 10189 | 12588 | **13900** | 15182 | 16428 |
| 10248 | 12682 | **14000** | 15286 | 16533 |
| 10307 | 12777 | **14100** | 15390 | 16639 |
| 10366 | 12871 | **14200** | 15495 | 16744 |
| 10425 | 12965 | **14300** | 15599 | 16850 |
| 10484 | 13059 | **14400** | 15703 | 16955 |
| 10543 | 13153 | **14500** | 15807 | 17061 |
| 10602 | 13247 | **14600** | 15912 | 17167 |
| 10661 | 13341 | **14700** | 16016 | 17272 |
| 10720 | 13435 | **14800** | 16120 | 17378 |
| 10779 | 13529 | **14900** | 16225 | 17483 |
| 10837 | 13624 | **15000** | 16329 | 17589 |
| 10896 | 13718 | **15100** | 16433 | 17694 |
| 10955 | 13812 | **15200** | 16537 | 17800 |
| 11014 | 13906 | **15300** | 16642 | 17905 |
| 11073 | 14000 | **15400** | 16746 | 18011 |
| 11132 | 14094 | **15500** | 16850 | 18117 |

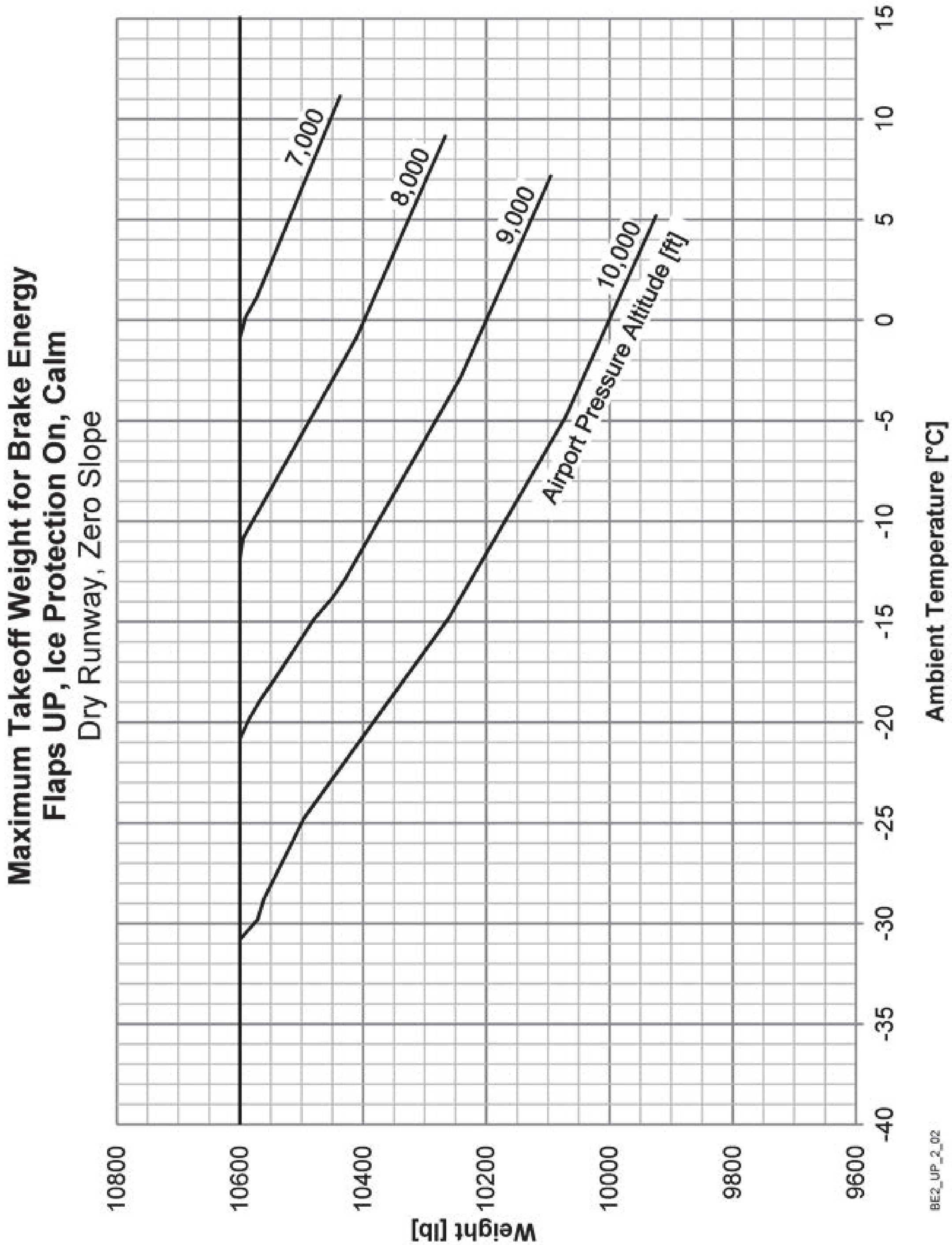
TOSC4_UP_0_02

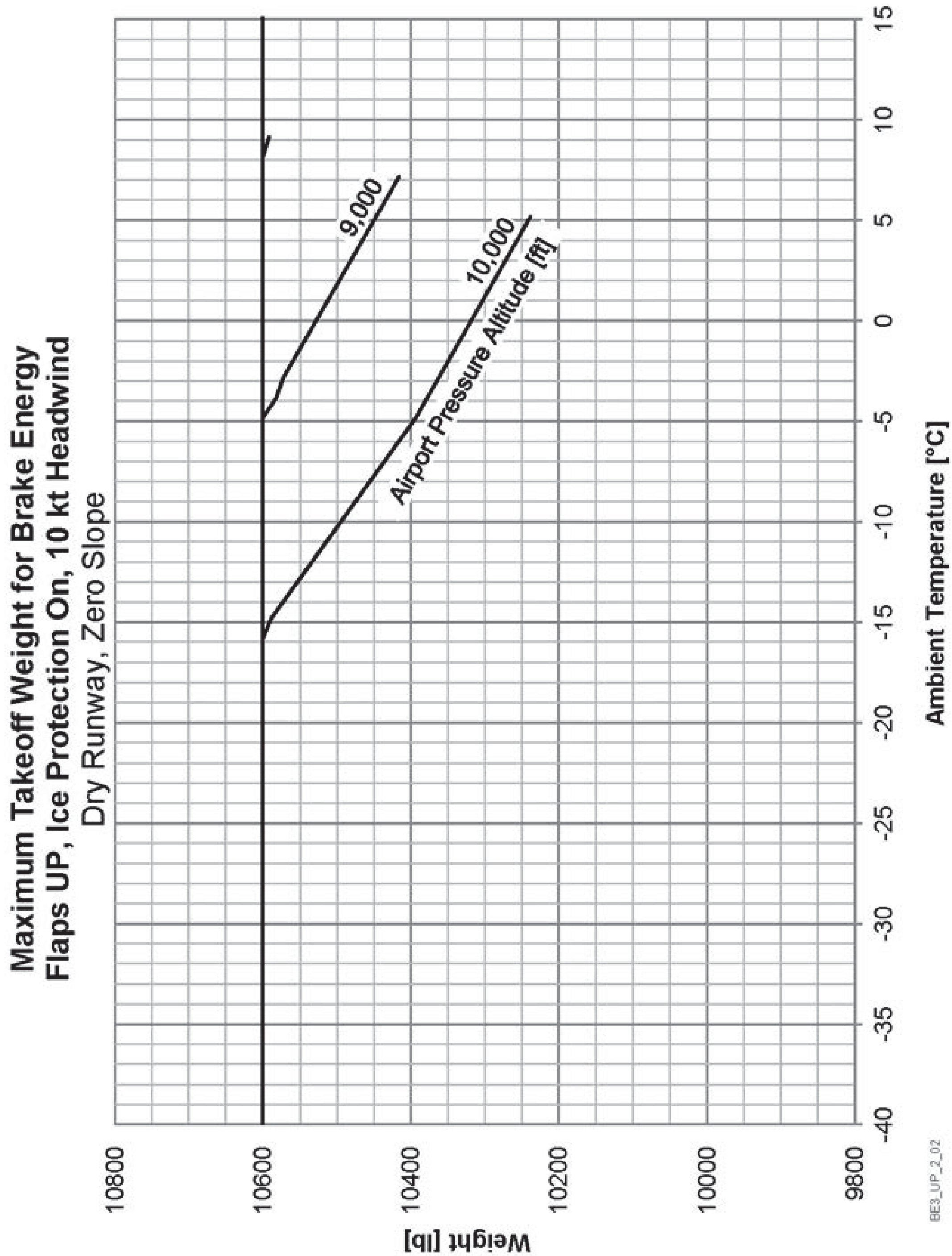


Maximum Takeoff Weight for Climb Requirement
Flaps UP, Ice Protection On
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
WAT_UP_2_02



Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection On, 10 kt Tailwind
Dry Runway, Zero Slope
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
9400
9200
9000
8800
BE1_UP_2_02

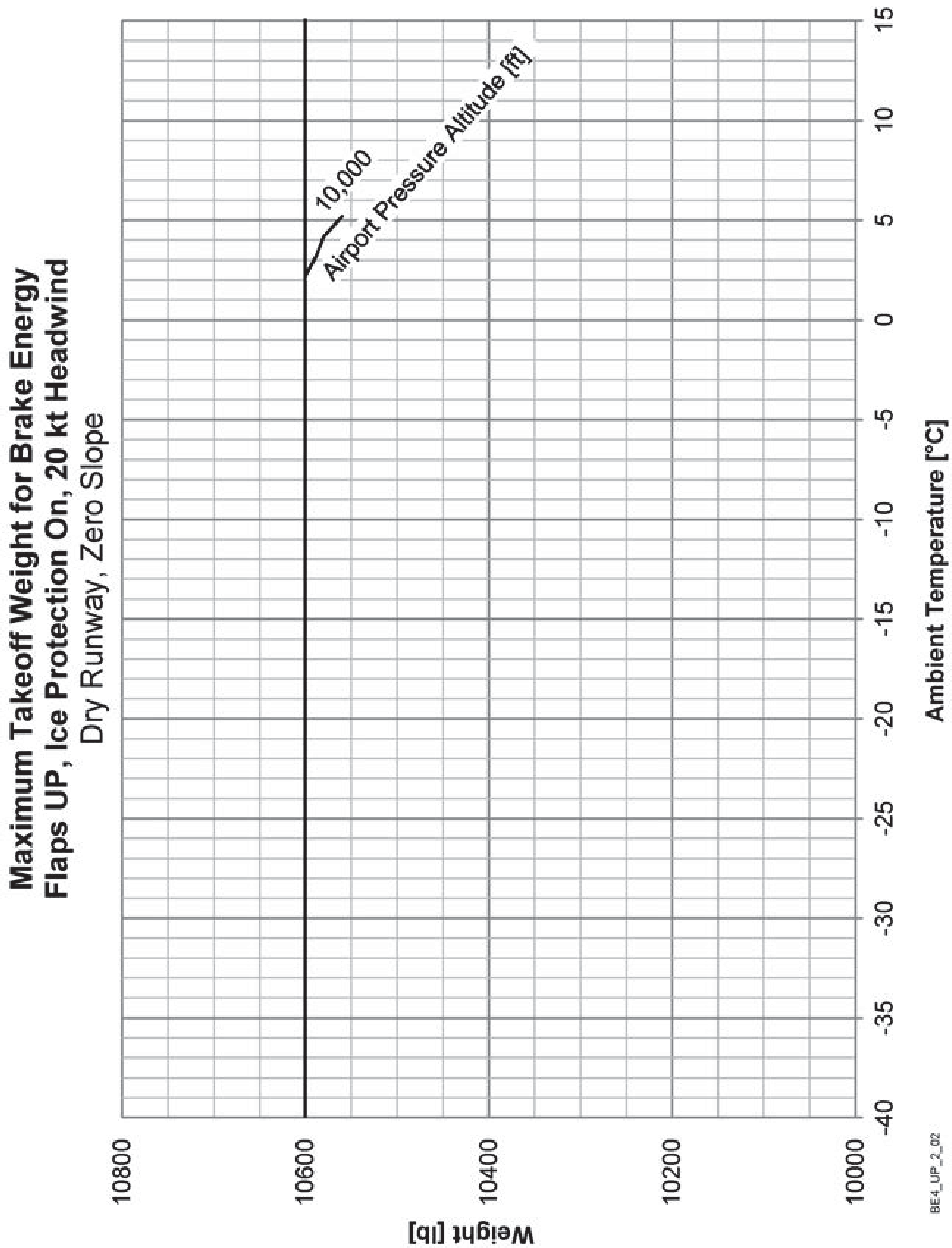

Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection On, Calm
Dry Runway, Zero Slope
7,000
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
15
Weight [lb]
10800
10600
10400
10200
10000
9800
9600
BE2_UP_2_02



Maximum Takeoff Weight for Brake Energy
Flaps UP, Ice Protection On, 10 kt Headwind
Dry Runway, Zero Slope
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [°C]
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
Weight [lb]
10800
10600
10400
10200
10000
9800
BE3_UP_2_02

# Honda Aircraft Company





| Slope Corrected Maximum Takeoff Weight for Brake Energy [lb] | | | | |
|---|---|---|---|---|
| Flaps UP, Ice Protection On | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 7471 | 7629 | **7800** | 7974 | 8237 |
| 7568 | 7728 | **7900** | 8075 | 8334 |
| 7666 | 7827 | **8000** | 8175 | 8431 |
| 7763 | 7926 | **8100** | 8276 | 8528 |
| 7861 | 8025 | **8200** | 8377 | 8625 |
| 7958 | 8124 | **8300** | 8478 | 8722 |
| 8055 | 8223 | **8400** | 8578 | 8819 |
| 8153 | 8322 | **8500** | 8679 | 8916 |
| 8250 | 8421 | **8600** | 8780 | 9013 |
| 8348 | 8520 | **8700** | 8881 | 9110 |
| 8445 | 8619 | **8800** | 8981 | 9207 |
| 8543 | 8718 | **8900** | 9082 | 9304 |
| 8640 | 8817 | **9000** | 9183 | 9401 |
| 8738 | 8916 | **9100** | 9284 | 9499 |
| 8835 | 9015 | **9200** | 9384 | 9596 |
| 8933 | 9114 | **9300** | 9485 | 9693 |
| 9030 | 9213 | **9400** | 9586 | 9790 |
| 9127 | 9312 | **9500** | 9686 | 9887 |
| 9225 | 9411 | **9600** | 9787 | 9984 |
| 9322 | 9510 | **9700** | 9888 | 10081 |
| 9420 | 9609 | **9800** | 9989 | 10178 |
| 9517 | 9708 | **9900** | 10089 | 10275 |
| 9615 | 9807 | **10000** | 10190 | 10372 |
| 9712 | 9906 | **10100** | 10291 | 10469 |
| 9810 | 10005 | **10200** | 10392 | 10566 |
| 9907 | 10104 | **10300** | 10492 | 10600 |
| 10005 | 10203 | **10400** | 10593 | 10600 |
| 10102 | 10302 | **10500** | 10600 | 10600 |
| 10199 | 10400 | **10600** | 10600 | 10600 |

BESC1_UP_2_03

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection On, Altitude -1000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 111 | 111 | 113 | 114 | 117 | 121 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 130 | 130 | 132 | 134 |
| | TOFL | 2736 | 2791 | 2923 | 3051 | 3270 | 3531 | 3892 |
| -30 | V1 | 110 | 111 | 113 | 114 | 117 | 121 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2826 | 2883 | 3021 | 3153 | 3381 | 3653 | 4020 |
| -20 | V1 | 110 | 111 | 113 | 114 | 117 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2913 | 2973 | 3116 | 3253 | 3489 | 3771 | 4143 |
| -10 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 3001 | 3063 | 3211 | 3354 | 3598 | 3891 | 4263 |
| -5 | V1 | 110 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 3042 | 3104 | 3256 | 3401 | 3649 | 3946 | 4312 |
| 0 | V1 | 109 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 3082 | 3146 | 3300 | 3447 | 3699 | 4001 | 4374 |
| 5 | V1 | 109 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 129 | 129 | 130 | 132 | 134 |
| | TOFL | 3123 | 3188 | 3344 | 3494 | 3750 | 4057 | 4436 |
| 10 | V1 | 109 | 110 | 112 | 113 | 116 | 120 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3163 | 3229 | 3389 | 3541 | 3801 | 4113 | 4498 |

TOFL_UP_2_-1_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection On, Altitude Sea Level** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 111 | 111 | 113 | 114 | 117 | 121 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2825 | 2881 | 3018 | 3150 | 3376 | 3647 | 4035 |
| -30 | V1 | 110 | 111 | 113 | 114 | 117 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 131 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2920 | 2979 | 3121 | 3258 | 3493 | 3775 | 4168 |
| -20 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 3007 | 3068 | 3216 | 3358 | 3603 | 3895 | 4290 |
| -10 | V1 | 110 | 110 | 112 | 114 | 117 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 129 | 129 | 130 | 132 | 134 |
| | TOFL | 3097 | 3160 | 3314 | 3461 | 3714 | 4016 | 4410 |
| -5 | V1 | 110 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3139 | 3203 | 3360 | 3509 | 3766 | 4074 | 4463 |
| 0 | V1 | 109 | 110 | 112 | 113 | 116 | 120 | 124 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3181 | 3247 | 3406 | 3558 | 3819 | 4131 | 4517 |
| 5 | V1 | 109 | 110 | 112 | 113 | 116 | 120 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3224 | 3291 | 3453 | 3608 | 3873 | 4190 | 4582 |
| 10 | V1 | 109 | 110 | 112 | 113 | 116 | 119 | 123 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 130 | 131 | 133 |
| | TOFL | 3267 | 3336 | 3500 | 3657 | 3927 | 4249 | 4647 |

TOFL_UP_2_0_02

**Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]**
**Dry Runway, Zero Slope, No Wind**

**Flaps UP, Ice Protection On, Altitude 1000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 111 | 112 | 113 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 131 | 130 | 130 | 129 | 130 | 132 | 134 |
| | TOFL | 2964 | 3023 | 3163 | 3302 | 3537 | 3818 | 4394 |
| -30 | V1 | 111 | 112 | 113 | 114 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 129 | 130 | 131 | 134 |
| | TOFL | 3063 | 3123 | 3269 | 3413 | 3658 | 3950 | 4499 |
| -20 | V1 | 111 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 130 | 131 | 133 |
| | TOFL | 3155 | 3218 | 3370 | 3519 | 3773 | 4077 | 4590 |
| -10 | V1 | 110 | 111 | 113 | 114 | 117 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3247 | 3312 | 3470 | 3624 | 3887 | 4202 | 4697 |
| -5 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3292 | 3358 | 3519 | 3676 | 3943 | 4263 | 4754 |
| 0 | V1 | 110 | 111 | 112 | 114 | 116 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3338 | 3405 | 3569 | 3727 | 3999 | 4324 | 4814 |
| 5 | V1 | 110 | 111 | 112 | 113 | 116 | 120 | 125 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3383 | 3452 | 3619 | 3780 | 4056 | 4387 | 4876 |
| 10 | V1 | 111 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3484 | 3552 | 3716 | 3879 | 4156 | 4488 | 5154 |

TOFL_UP_2_1_02

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection On, Altitude 2000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 112 | 112 | 114 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3107 | 3167 | 3312 | 3458 | 3702 | 3995 | 4767 |
| -30 | V1 | 111 | 112 | 113 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 130 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3207 | 3269 | 3421 | 3572 | 3825 | 4130 | 4867 |
| -20 | V1 | 111 | 112 | 113 | 114 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3303 | 3368 | 3525 | 3682 | 3945 | 4262 | 4954 |
| -10 | V1 | 111 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3400 | 3468 | 3631 | 3792 | 4065 | 4393 | 5039 |
| -5 | V1 | 111 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3449 | 3518 | 3684 | 3848 | 4125 | 4459 | 5085 |
| 0 | V1 | 110 | 111 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3498 | 3568 | 3737 | 3903 | 4185 | 4524 | 5133 |
| 5 | V1 | 110 | 111 | 112 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3547 | 3618 | 3790 | 3959 | 4246 | 4591 | 5190 |
| 10 | V1 | 112 | 113 | 114 | 115 | 118 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3704 | 3772 | 3942 | 4107 | 4390 | 4850 | 5898 |

TOFL_UP_2_2_02

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection On, Altitude 3000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 112 | 113 | 114 | 115 | 118 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3257 | 3319 | 3471 | 3621 | 3875 | 4215 | 5149 |
| -30 | V1 | 112 | 112 | 114 | 115 | 118 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 130 | 129 | 129 | 128 | 129 | 131 | 133 |
| | TOFL | 3365 | 3429 | 3587 | 3744 | 4008 | 4339 | 5244 |
| -20 | V1 | 111 | 112 | 113 | 115 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3460 | 3526 | 3690 | 3853 | 4126 | 4456 | 5332 |
| -10 | V1 | 111 | 112 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 131 | 133 |
| | TOFL | 3564 | 3633 | 3802 | 3971 | 4254 | 4596 | 5434 |
| -5 | V1 | 111 | 112 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3616 | 3687 | 3858 | 4030 | 4319 | 4666 | 5489 |
| 0 | V1 | 111 | 112 | 113 | 114 | 117 | 120 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 127 | 129 | 130 | 133 |
| | TOFL | 3669 | 3741 | 3915 | 4090 | 4384 | 4737 | 5548 |
| 5 | V1 | 111 | 112 | 113 | 114 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3748 | 3820 | 3997 | 4173 | 4469 | 4844 | 5768 |
| 10 | V1 | 113 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 128 | 129 | 132 |
| | TOFL | 3946 | 4017 | 4189 | 4356 | 4743 | 5605 | 6713 |

TOFL_UP_2_3_02

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection On, Altitude 4000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| -40 | V1 | 113 | 113 | 114 | 116 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3417 | 3481 | 3641 | 3797 | 4061 | 4520 | 5552 |
| -30 | V1 | 112 | 113 | 114 | 115 | 118 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 128 | 129 | 130 | 133 |
| | TOFL | 3526 | 3593 | 3758 | 3920 | 4195 | 4627 | 5655 |
| -20 | V1 | 112 | 112 | 114 | 115 | 118 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 127 | 128 | 130 | 133 |
| | TOFL | 3631 | 3700 | 3872 | 4040 | 4325 | 4751 | 5761 |
| -10 | V1 | 112 | 112 | 114 | 115 | 117 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3743 | 3815 | 3992 | 4167 | 4462 | 4888 | 5884 |
| -5 | V1 | 111 | 112 | 113 | 115 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3799 | 3872 | 4052 | 4230 | 4530 | 4956 | 5946 |
| 0 | V1 | 111 | 112 | 113 | 115 | 117 | 121 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3855 | 3929 | 4112 | 4293 | 4599 | 5026 | 6008 |
| 5 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3989 | 4063 | 4246 | 4423 | 4727 | 5428 | 6568 |
| 10 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4218 | 4289 | 4464 | 4727 | 5526 | 6480 | 7605 |

TOFL_UP_2_4_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind<br>Flaps UP, Ice Protection On, Altitude 5000 feet | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 113 | 113 | 115 | 116 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 129 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3585 | 3651 | 3818 | 3979 | 4255 | 4924 | 5977 |
| -30 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3704 | 3772 | 3946 | 4113 | 4400 | 5006 | 6091 |
| -20 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 129 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3812 | 3883 | 4063 | 4237 | 4534 | 5103 | 6216 |
| -10 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3930 | 4004 | 4191 | 4371 | 4679 | 5225 | 6353 |
| -5 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3990 | 4066 | 4255 | 4439 | 4752 | 5295 | 6424 |
| 0 | V1 | 112 | 112 | 114 | 115 | 117 | 122 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 4051 | 4127 | 4320 | 4507 | 4826 | 5373 | 6501 |
| 5 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 131 |
| | TOFL | 4246 | 4322 | 4505 | 4683 | 5272 | 6251 | 7404 |
| 10 | V1 | 116 | 116 | 118 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4507 | 4579 | 4899 | 5556 | 6447 | 7413 | 8556 |

TOFL_UP_2_5_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection On, Altitude 6000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 113 | 114 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 128 | 127 | 128 | 130 | 132 |
| | TOFL | 3759 | 3830 | 4003 | 4170 | 4504 | 5317 | 6396 |
| -30 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3881 | 3955 | 4135 | 4308 | 4634 | 5422 | 6532 |
| -20 | V1 | 113 | 113 | 115 | 116 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 4000 | 4076 | 4263 | 4443 | 4762 | 5529 | 6669 |
| -10 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 4128 | 4206 | 4400 | 4588 | 4909 | 5660 | 6829 |
| -5 | V1 | 112 | 113 | 114 | 115 | 118 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 128 | 129 | 132 |
| | TOFL | 4194 | 4274 | 4471 | 4662 | 4989 | 5735 | 6918 |
| 0 | V1 | 113 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4317 | 4397 | 4593 | 4782 | 5237 | 6155 | 7340 |
| 5 | V1 | 115 | 115 | 116 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 128 | 131 |
| | TOFL | 4547 | 4623 | 4829 | 5297 | 6212 | 7203 | 8374 |
| 10 | V1 | 118 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 125 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 4940 | 5109 | 5827 | 6511 | 7410 | 8397 | 9570 |

TOFL_UP_2_6_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind<br>Flaps UP, Ice Protection On, Altitude 7000 feet | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -40 | V1 | 114 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 127 | 128 | 130 | 132 |
| | TOFL | 3946 | 4020 | 4198 | 4372 | 4808 | 5731 | 6837 |
| -30 | V1 | 113 | 114 | 115 | 116 | 120 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 128 | 127 | 126 | 128 | 129 | 132 |
| | TOFL | 4079 | 4156 | 4342 | 4522 | 4948 | 5853 | 6990 |
| -20 | V1 | 113 | 114 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4205 | 4284 | 4478 | 4666 | 5091 | 5985 | 7154 |
| -10 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4345 | 4427 | 4628 | 4823 | 5259 | 6147 | 7345 |
| -5 | V1 | 113 | 113 | 115 | 116 | 119 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4420 | 4504 | 4709 | 4907 | 5356 | 6253 | 7466 |
| 0 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 125 | 127 | 129 | 131 |
| | TOFL | 4606 | 4686 | 4884 | 5199 | 6045 | 7061 | 8264 |
| 5 | V1 | 116 | 117 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | 130 |
| | TOFL | 4860 | 5009 | 5550 | 6258 | 7179 | 8185 | 9380 |
| 10 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 5831 | 6123 | 6829 | 7504 | 8417 | 9430 | 10639 |

TOFL_UP_2_7_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Ice Protection On, Altitude 8000 feet** | | | | | | | | |
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 128 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4143 | 4219 | 4404 | 4584 | 5217 | 6180 | 7316 |
| -30 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 132 |
| | TOFL | 4283 | 4362 | 4554 | 4742 | 5329 | 6319 | 7487 |
| -20 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 127 | 126 | 127 | 129 | 131 |
| | TOFL | 4425 | 4507 | 4708 | 4903 | 5478 | 6495 | 7695 |
| -10 | V1 | 113 | 114 | 115 | 116 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | **131** |
| | TOFL | 4581 | 4666 | 4875 | 5077 | 5665 | 6707 | **7938** |
| -5 | V1 | 114 | 114 | 115 | 116 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | **131** |
| | TOFL | 4687 | 4773 | 4982 | 5212 | 5930 | 6980 | **8221** |
| 0 | V1 | 115 | 116 | 118 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | **131** |
| | TOFL | 4913 | 4995 | 5361 | 6042 | 6987 | 8018 | **9242** |
| 5 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 125 | 125 | 124 | 125 | 127 | **130** |
| | TOFL | 5504 | 5807 | 6537 | 7234 | 8166 | 9194 | **10419** |
| 10 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 124 | 124 | 124 | 124 | 125 | 127 | **129** |
| | TOFL | 6853 | 7141 | 7838 | 8507 | 9438 | 10482 | **11734** |

TOFL_UP_2_8_02

| Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]<br>Dry Runway, Zero Slope, No Wind<br>Flaps UP, Ice Protection On, Altitude 9000 feet | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 114 | 115 | 116 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4347 | 4425 | 4618 | 4868 | 5644 | 6627 | 7789 |
| -30 | V1 | 114 | 114 | 115 | 117 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4501 | 4583 | 4783 | 5030 | 5787 | 6798 | 7995 |
| -20 | V1 | 114 | 114 | 115 | 117 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | **131** |
| | TOFL | 4659 | 4744 | 4952 | 5217 | 5989 | 7028 | **8258** |
| -10 | V1 | 114 | 114 | 115 | 117 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 127 | 126 | 126 | 125 | 127 | 129 | **131** |
| | TOFL | 4831 | 4919 | 5135 | 5426 | 6220 | 7284 | **8545** |
| -5 | V1 | 115 | 115 | 117 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 126 | 126 | 125 | 125 | 126 | 128 | **131** |
| | TOFL | 4993 | 5080 | 5354 | 5878 | 6853 | 7914 | **9173** |
| 0 | V1 | 117 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 125 | 125 | 124 | 126 | 128 | **130** |
| | TOFL | 5366 | 5538 | 6278 | 7002 | 7956 | 9006 | **10258** |
| 5 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | **126** |
| | V2 | 125 | 124 | 124 | 124 | 125 | 127 | **129** |
| | TOFL | 6536 | 6834 | 7556 | 8247 | 9195 | 10252 | **11519** |
| 10 | V1 | 119 | 119 | 119 | 119 | 121 | **123** | **126** |
| | VR | 119 | 119 | 119 | 119 | 121 | **123** | **126** |
| | V2 | 124 | 124 | 123 | 123 | 124 | **126** | **129** |
| | TOFL | 7880 | 8165 | 8857 | 9525 | 10478 | **11556** | **12856** |

TOFL_UP_2_9_02

Uncorrected Takeoff Field Length [feet] and Speeds [KIAS]
Dry Runway, Zero Slope, No Wind

**Flaps UP, Ice Protection On, Altitude 10,000 feet**

| Temp. [°C] | Data | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -40 | V1 | 115 | 115 | 116 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 127 | 126 | 126 | 127 | 129 | 131 |
| | TOFL | 4573 | 4654 | 4855 | 5218 | 6127 | 7132 | 8323 |
| -30 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 127 | 129 | 131 |
| | TOFL | 4741 | 4827 | 5035 | 5403 | 6310 | 7344 | 8570 |
| -20 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 127 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 4914 | 5003 | 5220 | 5614 | 6552 | 7615 | 8875 |
| -10 | V1 | 114 | 115 | 116 | 118 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 126 | 126 | 125 | 126 | 128 | 131 |
| | TOFL | 5094 | 5186 | 5411 | 5832 | 6793 | 7885 | 9182 |
| -5 | V1 | 116 | 117 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 126 | 125 | 125 | 124 | 126 | 128 | 130 |
| | TOFL | 5302 | 5478 | 6031 | 6783 | 7764 | 8839 | 10118 |
| 0 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 125 | 125 | 124 | 124 | 125 | 127 | 130 |
| | TOFL | 6211 | 6521 | 7267 | 7981 | 8946 | 10017 | 11298 |
| 5 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 124 | 124 | 124 | 123 | 125 | 127 | 129 |
| | TOFL | 7610 | 7905 | 8619 | 9307 | 10275 | 11366 | 12682 |
| 10 | V1 | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | VR | 119 | 119 | 119 | 119 | 121 | 123 | 126 |
| | V2 | 123 | 123 | 123 | 123 | 124 | 126 | 129 |
| | TOFL | 8954 | 9236 | 9926 | 10594 | 11572 | 12692 | 14048 |

TOFL_UP_2_10_02

| Wind Corrected V1 [KIAS] | | |
|---|---|---|
| **FLAPS UP Ice Protection On** | | |
| Tailwind | | Headwind |
| 10 | ◄ REF [0] ► | 30 |
| 108 | **109** | 111 |
| 109 | **110** | 112 |
| 110 | **111** | 113 |
| 111 | **112** | 114 |
| 112 | **113** | 114 |
| 113 | **114** | 115 |
| 114 | **115** | 116 |
| 115 | **116** | 117 |
| 116 | **117** | 118 |
| 117 | **118** | 119 |
| 118 | **119** | 120 |
| 119 | **120** | 121 |
| 120 | **121** | 122 |
| 121 | **122** | 123 |
| 122 | **123** | 124 |
| 123 | **124** | 125 |
| 124 | **125** | 126 |
| 125 | **126** | 126 |

V1WC_UP_2_03

| Slope Corrected V1 [KIAS] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection On | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 106 | 107 | **108** | 110 | 112 |
| 106 | 107 | **109** | 111 | 113 |
| 107 | 108 | **110** | 112 | 114 |
| 107 | 109 | **111** | 113 | 115 |
| 108 | 110 | **112** | 114 | 116 |
| 109 | 111 | **113** | 115 | 116 |
| 110 | 112 | **114** | 116 | 117 |
| 111 | 113 | **115** | 117 | 118 |
| 112 | 114 | **116** | 118 | 119 |
| 114 | 115 | **117** | 119 | 120 |
| 115 | 116 | **118** | 120 | 120 |
| 116 | 117 | **119** | 121 | 121 |
| 117 | 118 | **120** | 121 | 122 |
| 118 | 119 | **121** | 122 | 123 |
| 119 | 121 | **122** | 123 | 124 |
| 120 | 122 | **123** | 124 | 125 |
| 121 | 123 | **124** | 125 | 125 |
| 122 | 124 | **125** | 126 | 126 |
| 124 | 125 | **126** | 126 | 126 |

V1SC_UP_2_04

## Takeoff Rotation Speed ($V_R$) Slope Correction, Ice Protection On

**NOTE** $V_R$ with flaps up and Ice Protection On does not require slope correction.

| Slope Corrected V2 [KIAS] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 123 | 123 | **122** | 121 | 121 |
| 124 | 124 | **123** | 122 | 122 |
| 125 | 125 | **124** | 123 | 123 |
| 126 | 126 | **125** | 124 | 124 |
| 127 | 127 | **126** | 125 | 125 |
| 128 | 128 | **127** | 126 | 126 |
| 129 | 129 | **128** | 127 | 127 |
| 130 | 130 | **129** | 128 | 128 |
| 131 | 131 | **130** | 129 | 129 |
| 132 | 132 | **131** | 130 | 130 |
| 133 | 133 | **132** | 131 | 131 |
| 134 | 134 | **133** | 132 | 132 |
| 135 | 135 | **134** | 133 | 133 |

V2SC_UP_2_05

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection On | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 3311 | **2700** | 2535 | 2409 | 2265 |
| 3417 | **2800** | 2633 | 2503 | 2357 |
| 3523 | **2900** | 2730 | 2598 | 2449 |
| 3629 | **3000** | 2828 | 2692 | 2541 |
| 3734 | **3100** | 2925 | 2787 | 2634 |
| 3840 | **3200** | 3023 | 2881 | 2726 |
| 3946 | **3300** | 3121 | 2975 | 2818 |
| 4051 | **3400** | 3218 | 3070 | 2911 |
| 4157 | **3500** | 3316 | 3164 | 3003 |
| 4263 | **3600** | 3413 | 3259 | 3095 |
| 4369 | **3700** | 3511 | 3353 | 3187 |
| 4474 | **3800** | 3608 | 3448 | 3280 |
| 4580 | **3900** | 3706 | 3542 | 3372 |
| 4686 | **4000** | 3804 | 3636 | 3464 |
| 4791 | **4100** | 3901 | 3731 | 3557 |
| 4897 | **4200** | 3999 | 3825 | 3649 |
| 5003 | **4300** | 4096 | 3920 | 3741 |
| 5109 | **4400** | 4194 | 4014 | 3833 |
| 5214 | **4500** | 4291 | 4109 | 3926 |
| 5320 | **4600** | 4389 | 4203 | 4018 |
| 5426 | **4700** | 4487 | 4297 | 4110 |
| 5531 | **4800** | 4584 | 4392 | 4203 |
| 5637 | **4900** | 4682 | 4486 | 4295 |
| 5743 | **5000** | 4779 | 4581 | 4387 |
| 5849 | **5100** | 4877 | 4675 | 4479 |
| 5954 | **5200** | 4974 | 4770 | 4572 |
| 6060 | **5300** | 5072 | 4864 | 4664 |
| 6166 | **5400** | 5170 | 4958 | 4756 |
| 6271 | **5500** | 5267 | 5053 | 4849 |
| 6377 | **5600** | 5365 | 5147 | 4941 |
| 6483 | **5700** | 5462 | 5242 | 5033 |
| 6589 | **5800** | 5560 | 5336 | 5125 |
| 6694 | **5900** | 5657 | 5431 | 5218 |
| 6800 | **6000** | 5755 | 5525 | 5310 |

TOWC1_UP_2_03

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection On | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 6800 | **6000** | 5755 | 5525 | 5310 |
| 6906 | **6100** | 5853 | 5619 | 5402 |
| 7011 | **6200** | 5950 | 5714 | 5495 |
| 7117 | **6300** | 6048 | 5808 | 5587 |
| 7223 | **6400** | 6145 | 5903 | 5679 |
| 7329 | **6500** | 6243 | 5997 | 5771 |
| 7434 | **6600** | 6340 | 6092 | 5864 |
| 7540 | **6700** | 6438 | 6186 | 5956 |
| 7646 | **6800** | 6536 | 6280 | 6048 |
| 7751 | **6900** | 6633 | 6375 | 6141 |
| 7857 | **7000** | 6731 | 6469 | 6233 |
| 7963 | **7100** | 6828 | 6564 | 6325 |
| 8069 | **7200** | 6926 | 6658 | 6417 |
| 8174 | **7300** | 7023 | 6753 | 6510 |
| 8280 | **7400** | 7121 | 6847 | 6602 |
| 8386 | **7500** | 7219 | 6941 | 6694 |
| 8491 | **7600** | 7316 | 7036 | 6787 |
| 8597 | **7700** | 7414 | 7130 | 6879 |
| 8703 | **7800** | 7511 | 7225 | 6971 |
| 8809 | **7900** | 7609 | 7319 | 7063 |
| 8914 | **8000** | 7706 | 7414 | 7156 |
| 9020 | **8100** | 7804 | 7508 | 7248 |
| 9126 | **8200** | 7902 | 7602 | 7340 |
| 9231 | **8300** | 7999 | 7697 | 7433 |
| 9337 | **8400** | 8097 | 7791 | 7525 |
| 9443 | **8500** | 8194 | 7886 | 7617 |
| 9549 | **8600** | 8292 | 7980 | 7709 |
| 9654 | **8700** | 8389 | 8075 | 7802 |
| 9760 | **8800** | 8487 | 8169 | 7894 |
| 9866 | **8900** | 8585 | 8263 | 7986 |
| 9971 | **9000** | 8682 | 8358 | 8079 |
| 10077 | **9100** | 8780 | 8452 | 8171 |
| 10183 | **9200** | 8877 | 8547 | 8263 |
| 10289 | **9300** | 8975 | 8641 | 8355 |

TOWC2_UP_2_03

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 10289 | **9300** | 8975 | 8641 | 8355 |
| 10394 | **9400** | 9072 | 8736 | 8448 |
| 10500 | **9500** | 9170 | 8830 | 8540 |
| 10606 | **9600** | 9268 | 8924 | 8632 |
| 10711 | **9700** | 9365 | 9019 | 8725 |
| 10817 | **9800** | 9463 | 9113 | 8817 |
| 10923 | **9900** | 9560 | 9208 | 8909 |
| 11029 | **10000** | 9658 | 9302 | 9001 |
| 11134 | **10100** | 9755 | 9397 | 9094 |
| 11240 | **10200** | 9853 | 9491 | 9186 |
| 11346 | **10300** | 9951 | 9585 | 9278 |
| 11451 | **10400** | 10048 | 9680 | 9371 |
| 11557 | **10500** | 10146 | 9774 | 9463 |
| 11663 | **10600** | 10243 | 9869 | 9555 |
| 11769 | **10700** | 10341 | 9963 | 9647 |
| 11874 | **10800** | 10438 | 10058 | 9740 |
| 11980 | **10900** | 10536 | 10152 | 9832 |
| 12086 | **11000** | 10634 | 10246 | 9924 |
| 12191 | **11100** | 10731 | 10341 | 10017 |
| 12297 | **11200** | 10829 | 10435 | 10109 |
| 12403 | **11300** | 10926 | 10530 | 10201 |
| 12509 | **11400** | 11024 | 10624 | 10293 |
| 12614 | **11500** | 11121 | 10719 | 10386 |
| 12720 | **11600** | 11219 | 10813 | 10478 |
| 12826 | **11700** | 11317 | 10907 | 10570 |
| 12931 | **11800** | 11414 | 11002 | 10663 |
| 13037 | **11900** | 11512 | 11096 | 10755 |
| 13143 | **12000** | 11609 | 11191 | 10847 |
| 13249 | **12100** | 11707 | 11285 | 10939 |
| 13354 | **12200** | 11804 | 11380 | 11032 |
| 13460 | **12300** | 11902 | 11474 | 11124 |
| 13566 | **12400** | 12000 | 11568 | 11216 |
| 13671 | **12500** | 12097 | 11663 | 11309 |
| 13777 | **12600** | 12195 | 11757 | 11401 |

TOWC3_UP_2_03

| Wind Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | **◄ REF [0] ►** | 10 | 20 | 30 |
| 13777 | **12600** | 12195 | 11757 | 11401 |
| 13883 | **12700** | 12292 | 11852 | 11493 |
| 13989 | **12800** | 12390 | 11946 | 11585 |
| 14094 | **12900** | 12487 | 12041 | 11678 |

TOWC4_UP_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection On | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 2205 | 2205 | **2200** | 2278 | 2357 |
| 2308 | 2308 | **2300** | 2416 | 2536 |
| 2410 | 2410 | **2400** | 2555 | 2715 |
| 2513 | 2513 | **2500** | 2694 | 2894 |
| 2615 | 2615 | **2600** | 2833 | 3072 |
| 2718 | 2718 | **2700** | 2971 | 3251 |
| 2821 | 2821 | **2800** | 3110 | 3430 |
| 2923 | 2923 | **2900** | 3249 | 3609 |
| 3026 | 3026 | **3000** | 3388 | 3787 |
| 3128 | 3128 | **3100** | 3526 | 3966 |
| 3231 | 3231 | **3200** | 3665 | 4145 |
| 3315 | 3322 | **3300** | 3804 | 4323 |
| 3399 | 3414 | **3400** | 3943 | 4502 |
| 3483 | 3505 | **3500** | 4082 | 4681 |
| 3567 | 3596 | **3600** | 4220 | 4860 |
| 3651 | 3687 | **3700** | 4359 | 5038 |
| 3735 | 3778 | **3800** | 4498 | 5217 |
| 3819 | 3870 | **3900** | 4637 | 5396 |
| 3903 | 3961 | **4000** | 4775 | 5574 |
| 3987 | 4052 | **4100** | 4896 | 5717 |
| 4071 | 4143 | **4200** | 5006 | 5839 |
| 4155 | 4234 | **4300** | 5116 | 5962 |
| 4239 | 4326 | **4400** | 5226 | 6085 |
| 4323 | 4417 | **4500** | 5336 | 6207 |
| 4407 | 4508 | **4600** | 5446 | 6330 |
| 4491 | 4599 | **4700** | 5557 | 6453 |
| 4575 | 4690 | **4800** | 5667 | 6576 |
| 4659 | 4781 | **4900** | 5777 | 6698 |
| 4743 | 4873 | **5000** | 5887 | 6821 |
| 4827 | 4964 | **5100** | 5997 | 6935 |
| 4911 | 5055 | **5200** | 6107 | 7049 |
| 4995 | 5146 | **5300** | 6217 | 7162 |
| 5079 | 5237 | **5400** | 6328 | 7276 |
| 5156 | 5326 | **5500** | 6438 | 7389 |

TOSC1_UP_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | **◄ REF [0] ►** | 1 | 2 |
| 5156 | 5326 | **5500** | 6438 | 7389 |
| 5217 | 5406 | **5600** | 6548 | 7503 |
| 5278 | 5487 | **5700** | 6658 | 7616 |
| 5339 | 5567 | **5800** | 6768 | 7730 |
| 5400 | 5647 | **5900** | 6878 | 7844 |
| 5461 | 5728 | **6000** | 6982 | 7957 |
| 5522 | 5808 | **6100** | 7087 | 8071 |
| 5583 | 5889 | **6200** | 7191 | 8184 |
| 5644 | 5969 | **6300** | 7295 | 8298 |
| 5705 | 6050 | **6400** | 7399 | 8412 |
| 5766 | 6130 | **6500** | 7503 | 8525 |
| 5827 | 6211 | **6600** | 7608 | 8639 |
| 5888 | 6291 | **6700** | 7712 | 8752 |
| 5949 | 6371 | **6800** | 7816 | 8866 |
| 6010 | 6452 | **6900** | 7920 | 8980 |
| 6071 | 6532 | **7000** | 8024 | 9093 |
| 6132 | 6613 | **7100** | 8129 | 9201 |
| 6193 | 6693 | **7200** | 8233 | 9307 |
| 6254 | 6774 | **7300** | 8337 | 9414 |
| 6315 | 6854 | **7400** | 8441 | 9521 |
| 6376 | 6935 | **7500** | 8545 | 9627 |
| 6437 | 7015 | **7600** | 8650 | 9734 |
| 6498 | 7095 | **7700** | 8754 | 9840 |
| 6559 | 7176 | **7800** | 8858 | 9947 |
| 6620 | 7256 | **7900** | 8962 | 10054 |
| 6681 | 7337 | **8000** | 9066 | 10160 |
| 6742 | 7417 | **8100** | 9170 | 10267 |
| 6803 | 7498 | **8200** | 9275 | 10373 |
| 6864 | 7578 | **8300** | 9379 | 10480 |
| 6925 | 7659 | **8400** | 9483 | 10587 |
| 6986 | 7739 | **8500** | 9587 | 10693 |
| 7047 | 7819 | **8600** | 9691 | 10800 |
| 7108 | 7900 | **8700** | 9796 | 10906 |
| 7169 | 7980 | **8800** | 9900 | 11013 |

TOSC2_UP_2_03

| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| FLAPS UP, Ice Protection On | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 7169 | 7980 | **8800** | 9900 | 11013 |
| 7230 | 8061 | **8900** | 10002 | 11117 |
| 7291 | 8141 | **9000** | 10097 | 11213 |
| 7352 | 8222 | **9100** | 10192 | 11309 |
| 7412 | 8302 | **9200** | 10287 | 11405 |
| 7473 | 8382 | **9300** | 10382 | 11500 |
| 7534 | 8463 | **9400** | 10478 | 11596 |
| 7595 | 8543 | **9500** | 10573 | 11692 |
| 7656 | 8624 | **9600** | 10668 | 11788 |
| 7717 | 8704 | **9700** | 10763 | 11884 |
| 7778 | 8785 | **9800** | 10858 | 11980 |
| 7839 | 8865 | **9900** | 10953 | 12076 |
| 7900 | 8946 | **10000** | 11048 | 12171 |
| 7961 | 9026 | **10100** | 11144 | 12267 |
| 8022 | 9106 | **10200** | 11239 | 12363 |
| 8083 | 9187 | **10300** | 11334 | 12459 |
| 8144 | 9267 | **10400** | 11429 | 12555 |
| 8205 | 9348 | **10500** | 11524 | 12651 |
| 8266 | 9428 | **10600** | 11619 | 12747 |
| 8327 | 9509 | **10700** | 11715 | 12842 |
| 8388 | 9589 | **10800** | 11810 | 12938 |
| 8449 | 9670 | **10900** | 11905 | 13034 |
| 8510 | 9750 | **11000** | 12000 | 13130 |
| 8571 | 9830 | **11100** | 12095 | 13226 |
| 8632 | 9911 | **11200** | 12190 | 13322 |
| 8693 | 9991 | **11300** | 12285 | 13418 |
| 8754 | 10072 | **11400** | 12381 | 13513 |
| 8815 | 10152 | **11500** | 12476 | 13609 |
| 8876 | 10233 | **11600** | 12571 | 13705 |
| 8937 | 10313 | **11700** | 12666 | 13801 |
| 8998 | 10394 | **11800** | 12761 | 13897 |
| 9059 | 10474 | **11900** | 12856 | 13993 |
| 9120 | 10554 | **12000** | 12952 | 14089 |
| 9181 | 10635 | **12100** | 13047 | 14184 |

TOSC3_UP_2_03

# Honda Aircraft Company



| Slope Corrected Takeoff Field Length [feet] | | | | |
|---|---|---|---|---|
| **FLAPS UP, Ice Protection On** | | | | |
| Runway Gradient [%] | | | | |
| -2 | -1 | ◄ REF [0] ► | 1 | 2 |
| 9181 | 10635 | **12100** | 13047 | 14184 |
| 9242 | 10715 | **12200** | 13142 | 14280 |
| 9303 | 10796 | **12300** | 13237 | 14376 |
| 9364 | 10876 | **12400** | 13332 | 14472 |
| 9425 | 10957 | **12500** | 13427 | 14568 |
| 9486 | 11037 | **12600** | 13522 | 14664 |
| 9547 | 11118 | **12700** | 13618 | 14760 |
| 9608 | 11198 | **12800** | 13713 | 14855 |
| 9668 | 11278 | **12900** | 13808 | 14951 |
| 9729 | 11359 | **13000** | 13903 | 15047 |
| 9790 | 11439 | **13100** | 13998 | 15143 |
| 9851 | 11520 | **13200** | 14093 | 15239 |
| 9912 | 11600 | **13300** | 14189 | 15335 |
| 9973 | 11681 | **13400** | 14284 | 15431 |
| 10034 | 11761 | **13500** | 14379 | 15526 |
| 10095 | 11841 | **13600** | 14474 | 15622 |
| 10156 | 11922 | **13700** | 14569 | 15718 |
| 10217 | 12002 | **13800** | 14664 | 15814 |
| 10278 | 12083 | **13900** | 14759 | 15910 |
| 10339 | 12163 | **14000** | 14855 | 16006 |
| 10400 | 12244 | **14100** | 14950 | 16102 |

TOSC4_UP_2_03

**Net Takeoff Climb Gradient, Second Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection Off, V2**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| -1000 | -40 | 11.9 | 11.4 | 10.3 | 9.3 | 8.4 | 7.5 | 6.5 |
| | 15 | 12.2 | 11.7 | 10.6 | 9.6 | 8.6 | 7.7 | 6.7 |
| | 25 | 12.2 | 11.8 | 10.7 | 9.6 | 8.6 | 7.7 | 6.7 |
| | 35 | 10.4 | 9.9 | 8.9 | 8.0 | 7.1 | 6.2 | 5.3 |
| | 40 | 9.2 | 8.8 | 7.8 | 6.9 | 6.1 | 5.3 | 4.4 |
| | 45 | 8.0 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 | 3.5 |
| | 50 | 6.8 | 6.5 | 5.6 | 4.8 | 4.1 | 3.4 | 2.6 |
| | 55 | 5.7 | 5.3 | 4.6 | 3.8 | 3.1 | 2.5 | 1.8 |
| Sea Level | -40 | 11.6 | 11.2 | 10.1 | 9.1 | 8.2 | 7.3 | 6.3 |
| | 15 | 12.0 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.5 |
| | 25 | 12.0 | 11.6 | 10.5 | 9.5 | 8.5 | 7.6 | 6.6 |
| | 35 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.7 | 4.8 |
| | 40 | 8.5 | 8.1 | 7.2 | 6.4 | 5.5 | 4.8 | 3.9 |
| | 45 | 7.4 | 7.0 | 6.1 | 5.3 | 4.6 | 3.8 | 3.1 |
| | 50 | 6.2 | 5.9 | 5.1 | 4.3 | 3.6 | 2.9 | 2.2 |
| | 55 | 5.1 | 4.8 | 4.0 | 3.3 | 2.7 | 2.0 | 1.4 |
| 1000 | -40 | 11.3 | 10.8 | 9.8 | 8.8 | 7.9 | 7.0 | 6.0 |
| | 15 | 11.6 | 11.2 | 10.1 | 9.1 | 8.1 | 7.2 | 6.3 |
| | 25 | 11.2 | 10.8 | 9.7 | 8.7 | 7.8 | 6.9 | 6.0 |
| | 30 | 10.1 | 9.7 | 8.7 | 7.7 | 6.9 | 6.0 | 5.1 |
| | 35 | 9.0 | 8.6 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 |
| | 40 | 7.8 | 7.4 | 6.6 | 5.7 | 4.9 | 4.2 | 3.4 |
| | 45 | 6.7 | 6.3 | 5.5 | 4.7 | 4.0 | 3.3 | 2.5 |
| | 50 | 5.6 | 5.2 | 4.5 | 3.7 | 3.1 | 2.4 | 1.7 |
| 2000 | -40 | 10.9 | 10.5 | 9.4 | 8.5 | 7.6 | 6.7 | 5.8 |
| | 10 | 11.2 | 10.8 | 9.7 | 8.7 | 7.8 | 6.9 | 6.0 |
| | 20 | 11.3 | 10.8 | 9.8 | 8.8 | 7.8 | 7.0 | 6.0 |
| | 30 | 9.3 | 8.9 | 7.9 | 7.0 | 6.2 | 5.4 | 4.5 |
| | 35 | 8.2 | 7.8 | 6.9 | 6.1 | 5.3 | 4.5 | 3.7 |
| | 40 | 7.1 | 6.8 | 5.9 | 5.1 | 4.3 | 3.6 | 2.9 |
| | 45 | 6.0 | 5.7 | 4.9 | 4.1 | 3.4 | 2.8 | 2.1 |
| | 50 | 5.0 | 4.6 | 3.9 | 3.2 | 2.5 | 1.9 | 1.2 |

TCG2_UP_0_-1_06

# Honda Aircraft Company



**Net Takeoff Climb Gradient, Second Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection Off, V2**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| 3000 | -40 | 10.5 | 10.1 | 9.1 | 8.1 | 7.2 | 6.4 | 5.5 |
| | 10 | 10.9 | 10.4 | 9.4 | 8.4 | 7.5 | 6.6 | 5.7 |
| | 20 | 10.7 | 10.3 | 9.2 | 8.3 | 7.3 | 6.5 | 5.6 |
| | 25 | 9.6 | 9.2 | 8.2 | 7.3 | 6.4 | 5.6 | 4.7 |
| | 30 | 8.5 | 8.1 | 7.2 | 6.3 | 5.5 | 4.7 | 3.9 |
| | 35 | 7.4 | 7.1 | 6.2 | 5.4 | 4.6 | 3.9 | 3.1 |
| | 40 | 6.4 | 6.1 | 5.3 | 4.5 | 3.8 | 3.1 | 2.4 |
| | 45 | 5.4 | 5.1 | 4.3 | 3.6 | 2.9 | 2.3 | 1.6 |
| 4000 | -40 | 10.2 | 9.7 | 8.7 | 7.8 | 6.9 | 6.1 | 5.2 |
| | 10 | 10.5 | 10.0 | 9.0 | 8.1 | 7.2 | 6.3 | 5.4 |
| | 20 | 9.8 | 9.4 | 8.4 | 7.5 | 6.6 | 5.8 | 4.9 |
| | 25 | 8.7 | 8.4 | 7.4 | 6.5 | 5.7 | 4.9 | 4.1 |
| | 30 | 7.7 | 7.3 | 6.4 | 5.6 | 4.8 | 4.1 | 3.3 |
| | 35 | 6.7 | 6.3 | 5.5 | 4.7 | 4.0 | 3.3 | 2.6 |
| | 40 | 5.7 | 5.4 | 4.6 | 3.9 | 3.2 | 2.5 | 1.8 |
| | 45 | 4.8 | 4.4 | 3.7 | 3.0 | 2.4 | 1.8 | 1.1 |
| 5000 | -40 | 9.8 | 9.4 | 8.4 | 7.5 | 6.6 | 5.8 | 4.9 |
| | 5 | 10.1 | 9.6 | 8.6 | 7.7 | 6.8 | 6.0 | 5.1 |
| | 15 | 10.1 | 9.6 | 8.6 | 7.7 | 6.8 | 6.0 | 5.1 |
| | 25 | 7.9 | 7.6 | 6.7 | 5.8 | 5.0 | 4.3 | 3.5 |
| | 30 | 6.9 | 6.5 | 5.7 | 4.9 | 4.2 | 3.5 | 2.7 |
| | 35 | 5.9 | 5.6 | 4.8 | 4.1 | 3.4 | 2.7 | 2.0 |
| | 40 | 5.0 | 4.7 | 3.9 | 3.2 | 2.6 | 2.0 | 1.3 |
| | 45 | 4.1 | 3.8 | 3.1 | 2.4 | 1.8 | 1.2 | 0.6 |
| 6000 | -40 | 9.5 | 9.1 | 8.1 | 7.2 | 6.3 | 5.6 | 4.7 |
| | 0 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.7 | 4.8 |
| | 10 | 9.7 | 9.2 | 8.2 | 7.3 | 6.5 | 5.7 | 4.8 |
| | 20 | 8.2 | 7.8 | 6.9 | 6.0 | 5.2 | 4.5 | 3.7 |
| | 25 | 7.2 | 6.8 | 5.9 | 5.1 | 4.4 | 3.7 | 2.9 |
| | 30 | 6.2 | 5.8 | 5.0 | 4.3 | 3.5 | 2.9 | 2.2 |
| | 35 | 5.2 | 4.9 | 4.1 | 3.4 | 2.8 | 2.1 | 1.5 |
| | 40 | 4.3 | 4.0 | 3.3 | 2.6 | 2.0 | 1.4 | 0.8 |

TCG2_UP_0_3_06

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, V2** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 7000 | -40 | 9.2 | 8.8 | 7.8 | 6.9 | 6.1 | 5.3 | 4.4 |
| | 0 | 9.3 | 8.9 | 7.9 | 7.0 | 6.1 | 5.4 | 4.5 |
| | 10 | 9.2 | 8.8 | 7.9 | 7.0 | 6.1 | 5.3 | 4.5 |
| | 15 | 8.4 | 8.0 | 7.1 | 6.2 | 5.4 | 4.7 | 3.8 |
| | 20 | 7.4 | 7.0 | 6.2 | 5.4 | 4.6 | 3.9 | 3.1 |
| | 25 | 6.4 | 6.1 | 5.2 | 4.5 | 3.7 | 3.1 | 2.3 |
| | 30 | 5.5 | 5.1 | 4.3 | 3.6 | 2.9 | 2.3 | 1.6 |
| | 35 | 4.6 | 4.3 | 3.5 | 2.8 | 2.2 | 1.6 | 1.0 |
| 8000 | -40 | 8.8 | 8.4 | 7.5 | 6.6 | 5.8 | 5.0 | 4.2 |
| | -10 | 8.9 | 8.5 | 7.6 | 6.7 | 5.8 | 5.1 | 4.2 |
| | 0 | 8.9 | 8.5 | 7.5 | 6.6 | 5.8 | 5.0 | 4.2 |
| | 10 | 8.7 | 8.3 | 7.3 | 6.4 | 5.6 | 4.9 | 4.0 |
| | 15 | 7.6 | 7.2 | 6.3 | 5.5 | 4.7 | 4.0 | 3.2 |
| | 20 | 6.6 | 6.3 | 5.4 | 4.7 | 3.9 | 3.2 | 2.5 |
| | 25 | 5.7 | 5.3 | 4.6 | 3.8 | 3.1 | 2.5 | 1.8 |
| | 30 | 4.8 | 4.5 | 3.7 | 3.0 | 2.4 | 1.8 | 1.1 |
| 9000 | -40 | 8.5 | 8.1 | 7.2 | 6.4 | 5.5 | 4.8 | 4.0 |
| | -10 | 8.5 | 8.1 | 7.2 | 6.3 | 5.5 | 4.8 | 3.9 |
| | 0 | 8.5 | 8.1 | 7.2 | 6.3 | 5.5 | 4.7 | 3.9 |
| | 10 | 7.8 | 7.4 | 6.5 | 5.7 | 4.9 | 4.2 | 3.4 |
| | 15 | 6.8 | 6.5 | 5.6 | 4.8 | 4.1 | 3.4 | 2.6 |
| | 20 | 5.9 | 5.6 | 4.8 | 4.0 | 3.3 | 2.7 | 2.0 |
| | 25 | 5.0 | 4.7 | 3.9 | 3.2 | 2.5 | 1.9 | 1.3 |
| | 30 | 4.1 | 3.8 | 3.1 | 2.4 | 1.8 | 1.2 | 0.6 |
| 10,000 | -40 | 8.1 | 7.7 | 6.8 | 6.0 | 5.2 | 4.4 | 3.6 |
| | -5 | 8.1 | 7.7 | 6.8 | 6.0 | 5.2 | 4.4 | 3.6 |
| | 5 | 8.1 | 7.7 | 6.8 | 5.9 | 5.1 | 4.4 | 3.6 |
| | 10 | 7.0 | 6.6 | 5.8 | 5.0 | 4.2 | 3.5 | 2.8 |
| | 15 | 6.1 | 5.7 | 4.9 | 4.2 | 3.5 | 2.8 | 2.1 |
| | 20 | 5.2 | 4.9 | 4.1 | 3.4 | 2.7 | 2.1 | 1.4 |
| | 25 | 4.3 | 4.0 | 3.3 | 2.6 | 2.0 | 1.4 | 0.8 |
| | 30 | 3.5 | 3.2 | 2.5 | 1.9 | 1.3 | 0.7 | 0.1 |

TCG2_UP_0_7_07

| Wind Corrected Takeoff Climb Gradient [%] | | | | |
|---|---|---|---|---|
| FLAPS UP and TO/APPR, V2, Ice Protection Off | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.0 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.5 |
| 0.9 | **1.0** | 1.0 | 1.0 | 1.1 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.8 | **2.0** | 2.1 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.7 | 2.8 |
| 2.7 | **3.0** | 3.1 | 3.2 | 3.4 |
| 3.2 | **3.5** | 3.6 | 3.8 | 3.9 |
| 3.6 | **4.0** | 4.2 | 4.3 | 4.5 |
| 4.0 | **4.5** | 4.7 | 4.9 | 5.1 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.7 |
| 4.9 | **5.5** | 5.7 | 6.0 | 6.2 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.8 |
| 5.8 | **6.5** | 6.8 | 7.1 | 7.4 |
| 6.3 | **7.0** | 7.3 | 7.6 | 7.9 |
| 6.7 | **7.5** | 7.8 | 8.2 | 8.5 |
| 7.1 | **8.0** | 8.3 | 8.7 | 9.1 |
| 7.6 | **8.5** | 8.9 | 9.2 | 9.7 |
| 8.0 | **9.0** | 9.4 | 9.8 | 10.2 |
| 8.5 | **9.5** | 9.9 | 10.3 | 10.8 |
| 8.9 | **10.0** | 10.4 | 10.9 | 11.4 |
| 9.4 | **10.5** | 10.9 | 11.4 | 12.0 |
| 9.8 | **11.0** | 11.5 | 12.0 | 12.5 |
| 10.2 | **11.5** | 12.0 | 12.5 | 13.1 |
| 10.7 | **12.0** | 12.5 | 13.1 | 13.7 |

CGWC_TO_ALL_05

**NOTE** Use this table when determining the ground reference flight path for obstacle clearance with Ice Protection Off.

| Net Takeoff Climb Gradient, Second Segment [%]<br>Zero Slope, No Wind<br>Flaps UP, Gear UP, Ice Protection On, V2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| -1000 | -40 | 11.9 | 11.4 | 10.3 | 9.4 | 8.4 | 7.5 | 6.5 |
| | -30 | 11.9 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.5 |
| | -20 | 12.0 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.6 |
| | -10 | 12.0 | 11.5 | 10.5 | 9.5 | 8.5 | 7.6 | 6.6 |
| | -5 | 12.1 | 11.6 | 10.5 | 9.5 | 8.5 | 7.6 | 6.6 |
| | 0 | 12.1 | 11.6 | 10.5 | 9.5 | 8.6 | 7.6 | 6.7 |
| | 5 | 12.1 | 11.7 | 10.6 | 9.6 | 8.6 | 7.7 | 6.7 |
| | 10 | 12.2 | 11.7 | 10.6 | 9.6 | 8.6 | 7.7 | 6.7 |
| Sea Level | -40 | 11.6 | 11.2 | 10.1 | 9.1 | 8.2 | 7.3 | 6.3 |
| | -30 | 11.7 | 11.2 | 10.2 | 9.2 | 8.2 | 7.3 | 6.4 |
| | -20 | 11.7 | 11.3 | 10.2 | 9.2 | 8.3 | 7.4 | 6.4 |
| | -10 | 11.8 | 11.4 | 10.3 | 9.3 | 8.3 | 7.4 | 6.5 |
| | -5 | 11.9 | 11.4 | 10.3 | 9.3 | 8.4 | 7.5 | 6.5 |
| | 0 | 11.9 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.5 |
| | 5 | 12.0 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.5 |
| | 10 | 12.0 | 11.5 | 10.4 | 9.4 | 8.4 | 7.5 | 6.6 |
| 1000 | -40 | 11.3 | 10.8 | 9.8 | 8.8 | 7.9 | 7.0 | 6.1 |
| | -30 | 11.3 | 10.9 | 9.8 | 8.9 | 7.9 | 7.0 | 6.1 |
| | -20 | 11.4 | 11.0 | 9.9 | 8.9 | 8.0 | 7.1 | 6.1 |
| | -10 | 11.5 | 11.0 | 10.0 | 9.0 | 8.0 | 7.1 | 6.2 |
| | -5 | 11.5 | 11.1 | 10.0 | 9.0 | 8.1 | 7.2 | 6.2 |
| | 0 | 11.6 | 11.1 | 10.0 | 9.0 | 8.1 | 7.2 | 6.2 |
| | 5 | 11.6 | 11.1 | 10.1 | 9.1 | 8.1 | 7.2 | 6.3 |
| | 10 | 11.1 | 10.7 | 9.6 | 8.7 | 7.7 | 6.9 | 5.9 |
| 2000 | -40 | 10.9 | 10.5 | 9.4 | 8.5 | 7.6 | 6.7 | 5.8 |
| | -30 | 11.0 | 10.6 | 9.5 | 8.6 | 7.6 | 6.8 | 5.8 |
| | -20 | 11.1 | 10.6 | 9.6 | 8.6 | 7.7 | 6.8 | 5.9 |
| | -10 | 11.2 | 10.7 | 9.7 | 8.7 | 7.8 | 6.9 | 5.9 |
| | -5 | 11.2 | 10.8 | 9.7 | 8.7 | 7.8 | 6.9 | 6.0 |
| | 0 | 11.2 | 10.8 | 9.7 | 8.7 | 7.8 | 6.9 | 6.0 |
| | 5 | 11.3 | 10.8 | 9.7 | 8.8 | 7.8 | 7.0 | 6.0 |
| | 10 | 10.3 | 9.9 | 8.8 | 7.9 | 7.0 | 6.2 | 5.3 |

TCG2_UP_2_-1_02

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind<br>Flaps UP, Gear UP, Ice Protection On, V2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 3000 | -40 | 10.6 | 10.1 | 9.1 | 8.2 | 7.3 | 6.4 | 5.5 |
| | -30 | 10.7 | 10.2 | 9.2 | 8.3 | 7.3 | 6.5 | 5.6 |
| | -20 | 10.8 | 10.3 | 9.3 | 8.3 | 7.4 | 6.6 | 5.6 |
| | -10 | 10.8 | 10.4 | 9.3 | 8.4 | 7.5 | 6.6 | 5.7 |
| | -5 | 10.9 | 10.4 | 9.4 | 8.4 | 7.5 | 6.6 | 5.7 |
| | 0 | 10.9 | 10.4 | 9.4 | 8.4 | 7.5 | 6.6 | 5.7 |
| | 5 | 10.7 | 10.2 | 9.2 | 8.2 | 7.3 | 6.5 | 5.6 |
| | 10 | 9.4 | 9.0 | 8.0 | 7.1 | 6.3 | 5.5 | 4.6 |
| 4000 | -40 | 10.2 | 9.8 | 8.8 | 7.9 | 7.0 | 6.1 | 5.2 |
| | -30 | 10.3 | 9.9 | 8.9 | 7.9 | 7.0 | 6.2 | 5.3 |
| | -20 | 10.4 | 10.0 | 8.9 | 8.0 | 7.1 | 6.3 | 5.4 |
| | -10 | 10.4 | 10.0 | 9.0 | 8.1 | 7.1 | 6.3 | 5.4 |
| | -5 | 10.5 | 10.0 | 9.0 | 8.1 | 7.2 | 6.3 | 5.4 |
| | 0 | 10.5 | 10.1 | 9.0 | 8.1 | 7.2 | 6.3 | 5.4 |
| | 5 | 9.8 | 9.4 | 8.4 | 7.5 | 6.6 | 5.8 | 4.9 |
| | 10 | 8.5 | 8.1 | 7.2 | 6.3 | 5.5 | 4.8 | 3.9 |
| 5000 | -40 | 9.9 | 9.5 | 8.5 | 7.6 | 6.7 | 5.9 | 5.0 |
| | -30 | 10.0 | 9.5 | 8.6 | 7.6 | 6.7 | 5.9 | 5.0 |
| | -20 | 10.0 | 9.6 | 8.6 | 7.7 | 6.8 | 6.0 | 5.1 |
| | -10 | 10.1 | 9.7 | 8.7 | 7.7 | 6.8 | 6.0 | 5.1 |
| | -5 | 10.1 | 9.7 | 8.7 | 7.7 | 6.9 | 6.0 | 5.1 |
| | 0 | 10.1 | 9.7 | 8.7 | 7.8 | 6.9 | 6.0 | 5.1 |
| | 5 | 8.9 | 8.5 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 |
| | 10 | 7.6 | 7.2 | 6.4 | 5.5 | 4.8 | 4.0 | 3.3 |
| 6000 | -40 | 9.6 | 9.1 | 8.2 | 7.3 | 6.4 | 5.6 | 4.7 |
| | -30 | 9.6 | 9.2 | 8.2 | 7.3 | 6.5 | 5.7 | 4.8 |
| | -20 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.7 | 4.8 |
| | -10 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.7 | 4.9 |
| | -5 | 9.7 | 9.3 | 8.3 | 7.4 | 6.5 | 5.7 | 4.9 |
| | 0 | 9.3 | 8.9 | 7.9 | 7.0 | 6.1 | 5.4 | 4.5 |
| | 5 | 8.0 | 7.6 | 6.7 | 5.9 | 5.1 | 4.4 | 3.6 |
| | 10 | 6.8 | 6.4 | 5.6 | 4.8 | 4.0 | 3.4 | 2.6 |

TCG2_UP_2_3_02

| Net Takeoff Climb Gradient, Second Segment [%] Zero Slope, No Wind — Flaps UP, Gear UP, Ice Protection On, V2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 7000 | -40 | 9.2 | 8.8 | 7.9 | 7.0 | 6.1 | 5.3 | 4.5 |
| | -30 | 9.3 | 8.9 | 7.9 | 7.0 | 6.2 | 5.4 | 4.5 |
| | -20 | 9.4 | 8.9 | 8.0 | 7.1 | 6.2 | 5.4 | 4.6 |
| | -10 | 9.4 | 8.9 | 8.0 | 7.1 | 6.2 | 5.4 | 4.6 |
| | -5 | 9.3 | 8.9 | 8.0 | 7.1 | 6.2 | 5.4 | 4.5 |
| | 0 | 8.4 | 8.0 | 7.1 | 6.2 | 5.4 | 4.6 | 3.8 |
| | 5 | 7.1 | 6.8 | 5.9 | 5.1 | 4.4 | 3.7 | 2.9 |
| | 10 | 5.9 | 5.6 | 4.8 | 4.0 | 3.3 | 2.7 | 2.0 |
| 8000 | -40 | 8.9 | 8.5 | 7.6 | 6.7 | 5.9 | 5.1 | 4.2 |
| | -30 | 9.0 | 8.6 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 |
| | -20 | 9.0 | 8.6 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 |
| | -10 | 8.9 | 8.5 | 7.6 | 6.7 | 5.9 | 5.1 | 4.3 |
| | -5 | 8.7 | 8.3 | 7.4 | 6.5 | 5.7 | 4.9 | 4.1 |
| | 0 | 7.5 | 7.1 | 6.3 | 5.4 | 4.7 | 4.0 | 3.2 |
| | 5 | 6.3 | 6.0 | 5.1 | 4.4 | 3.7 | 3.0 | 2.3 |
| | 10 | 5.1 | 4.8 | 4.1 | 3.4 | 2.7 | 2.1 | 1.4 |
| 9000 | -40 | 8.6 | 8.2 | 7.3 | 6.4 | 5.6 | 4.8 | 4.0 |
| | -30 | 8.6 | 8.2 | 7.3 | 6.4 | 5.6 | 4.8 | 4.0 |
| | -20 | 8.6 | 8.2 | 7.3 | 6.4 | 5.6 | 4.8 | 4.0 |
| | -10 | 8.5 | 8.1 | 7.2 | 6.3 | 5.5 | 4.8 | 3.9 |
| | -5 | 7.9 | 7.5 | 6.6 | 5.8 | 5.0 | 4.2 | 3.4 |
| | 0 | 6.7 | 6.3 | 5.5 | 4.7 | 4.0 | 3.3 | 2.6 |
| | 5 | 5.5 | 5.2 | 4.4 | 3.7 | 3.0 | 2.4 | 1.7 |
| | 10 | 4.4 | 4.1 | 3.4 | 2.7 | 2.1 | 1.5 | 0.9 |
| 10,000 | -40 | 8.2 | 7.8 | 6.9 | 6.1 | 5.3 | 4.5 | 3.7 |
| | -30 | 8.2 | 7.8 | 6.9 | 6.1 | 5.3 | 4.5 | 3.7 |
| | -20 | 8.2 | 7.8 | 6.9 | 6.0 | 5.2 | 4.5 | 3.7 |
| | -10 | 8.1 | 7.7 | 6.8 | 6.0 | 5.2 | 4.4 | 3.6 |
| | -5 | 7.1 | 6.7 | 5.8 | 5.0 | 4.3 | 3.6 | 2.8 |
| | 0 | 5.9 | 5.5 | 4.7 | 4.0 | 3.3 | 2.6 | 1.9 |
| | 5 | 4.7 | 4.4 | 3.7 | 3.0 | 2.3 | 1.7 | 1.1 |
| | 10 | 3.7 | 3.4 | 2.7 | 2.1 | 1.5 | 0.9 | 0.3 |

TCG2_UP_2_7_02

| Wind Corrected Takeoff Climb Gradient [%] | | | | |
|---|---|---|---|---|
| FLAPS UP and TO/APPR, V2, Ice Protection On | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.4 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.0 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.9 | **2.0** | 2.0 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.7 |
| 2.7 | **3.0** | 3.1 | 3.2 | 3.3 |
| 3.2 | **3.5** | 3.6 | 3.7 | 3.9 |
| 3.6 | **4.0** | 4.1 | 4.3 | 4.4 |
| 4.1 | **4.5** | 4.7 | 4.8 | 5.0 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.6 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.2 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.7 |
| 5.8 | **6.5** | 6.8 | 7.0 | 7.3 |
| 6.3 | **7.0** | 7.3 | 7.6 | 7.9 |
| 6.7 | **7.5** | 7.8 | 8.1 | 8.5 |
| 7.2 | **8.0** | 8.3 | 8.7 | 9.0 |
| 7.6 | **8.5** | 8.8 | 9.2 | 9.6 |
| 8.1 | **9.0** | 9.4 | 9.8 | 10.2 |
| 8.5 | **9.5** | 9.9 | 10.3 | 10.8 |
| 8.9 | **10.0** | 10.4 | 10.9 | 11.3 |
| 9.4 | **10.5** | 10.9 | 11.4 | 11.9 |
| 9.8 | **11.0** | 11.5 | 11.9 | 12.5 |
| 10.3 | **11.5** | 12.0 | 12.5 | 13.1 |
| 10.7 | **12.0** | 12.5 | 13.0 | 13.6 |

CGWC_UP_2_03

**NOTE** Use this table when determining the ground reference flight path for obstacle clearance with Ice Protection On.

**Net Takeoff Climb Gradient, Final Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection Off, 140 KIAS**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| -1000 | -40 | 9.8 | 9.4 | 8.5 | 7.6 | 6.9 | 6.1 | 5.3 |
| | 15 | 10.2 | 9.8 | 8.9 | 8.0 | 7.2 | 6.4 | 5.6 |
| | 25 | 10.3 | 9.9 | 8.9 | 8.0 | 7.2 | 6.5 | 5.7 |
| | 35 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 40 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 45 | 6.5 | 6.2 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | 50 | 5.3 | 5.1 | 4.4 | 3.7 | 3.2 | 2.6 | 2.0 |
| | 55 | 4.2 | 4.0 | 3.3 | 2.8 | 2.3 | 1.8 | 1.2 |
| Sea Level | -40 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | 15 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 25 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 35 | 7.8 | 7.4 | 6.6 | 5.8 | 5.2 | 4.5 | 3.8 |
| | 40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 |
| | 45 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | 2.3 |
| | 50 | 4.7 | 4.4 | 3.8 | 3.2 | 2.6 | 2.1 | 1.5 |
| | 55 | 3.6 | 3.4 | 2.8 | 2.2 | 1.7 | 1.3 | 0.7 |
| 1000 | -40 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 15 | 9.5 | 9.1 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | 25 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 30 | 8.0 | 7.7 | 6.8 | 6.1 | 5.4 | 4.7 | 4.0 |
| | 35 | 7.0 | 6.7 | 5.9 | 5.2 | 4.5 | 3.9 | 3.2 |
| | 40 | 6.0 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 | 2.5 |
| | 45 | 5.1 | 4.8 | 4.1 | 3.5 | 2.9 | 2.4 | 1.8 |
| | 50 | 4.1 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 |
| 2000 | -40 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 10 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 20 | 9.2 | 8.8 | 7.9 | 7.1 | 6.3 | 5.6 | 4.8 |
| | 30 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | 35 | 6.2 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 |
| | 40 | 5.3 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.0 |
| | 45 | 4.4 | 4.1 | 3.5 | 2.9 | 2.4 | 1.9 | 1.3 |
| | 50 | 3.5 | 3.2 | 2.6 | 2.1 | 1.6 | 1.2 | 0.6 |

TCG3_UP_0_-1_06

Net Takeoff Climb Gradient, Final Segment [%]
Zero Slope, No Wind

**Flaps UP, Gear UP, Ice Protection Off, 140 KIAS**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
|---|---|---|---|---|---|---|---|---|
| 3000 | -40 | 8.4 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 10 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 20 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 25 | 7.4 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.6 |
| | 30 | 6.4 | 6.1 | 5.3 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 35 | 5.5 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.1 |
| | 40 | 4.6 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 |
| | 45 | 3.7 | 3.5 | 2.9 | 2.4 | 1.9 | 1.4 | **0.9** |
| 4000 | -40 | 8.1 | 7.7 | 6.9 | 6.1 | 5.4 | 4.8 | 4.0 |
| | 10 | 8.3 | 8.0 | 7.1 | 6.3 | 5.6 | 5.0 | 4.2 |
| | 20 | 7.7 | 7.3 | 6.5 | 5.8 | 5.1 | 4.5 | 3.8 |
| | 25 | 6.6 | 6.3 | 5.5 | 4.9 | 4.2 | 3.6 | 3.0 |
| | 30 | 5.6 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 | 2.3 |
| | 35 | 4.8 | 4.5 | 3.8 | 3.2 | 2.7 | 2.2 | **1.6** |
| | 40 | 3.9 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | **1.0** |
| | 45 | 3.1 | 2.9 | 2.3 | 1.8 | 1.3 | **0.9** | **0.4** |
| 5000 | -40 | 7.7 | 7.4 | 6.6 | 5.8 | 5.1 | 4.5 | 3.8 |
| | 5 | 7.9 | 7.6 | 6.7 | 6.0 | 5.3 | 4.6 | 3.9 |
| | 15 | 7.9 | 7.5 | 6.7 | 6.0 | 5.3 | 4.6 | 3.9 |
| | 25 | 5.9 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 | **2.4** |
| | 30 | 4.9 | 4.7 | 4.0 | 3.4 | 2.8 | 2.3 | **1.7** |
| | 35 | 4.1 | 3.8 | 3.2 | 2.7 | 2.1 | 1.7 | **1.1** |
| | 40 | 3.3 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | **0.5** |
| | 45 | 2.5 | 2.3 | 1.8 | 1.3 | **0.9** | **0.4** | **0.0** |
| 6000 | -40 | 7.4 | 7.1 | 6.3 | 5.5 | 4.9 | 4.2 | 3.6 |
| | 0 | 7.5 | 7.2 | 6.4 | 5.6 | 5.0 | 4.3 | 3.6 |
| | 10 | 7.5 | 7.2 | 6.3 | 5.6 | 4.9 | 4.3 | **3.6** |
| | 20 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | **2.6** |
| | 25 | 5.2 | 4.9 | 4.2 | 3.6 | 3.0 | 2.5 | **1.9** |
| | 30 | 4.3 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 | **1.3** |
| | 35 | 3.5 | 3.2 | 2.7 | 2.1 | 1.6 | 1.2 | **0.7** |
| | 40 | 2.7 | 2.5 | 1.9 | 1.5 | 1.0 | **0.6** | **0.1** |

TCG3_UP_0_3_06

**Net Takeoff Climb Gradient, Final Segment [%]**
**Zero Slope, No Wind**

**Flaps UP, Gear UP, Ice Protection Off, 140 KIAS**

| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8000 | 8500 | 9000 | 9500 | 10000 | 10600 |
| 7000 | -40 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 0 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 10 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.3 |
| | 15 | 6.4 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 |
| | 20 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| | 25 | 4.5 | 4.2 | 3.6 | 3.0 | 2.5 | 2.0 | 1.4 |
| | 30 | 3.7 | 3.4 | 2.8 | 2.3 | 1.8 | 1.3 | 0.8 |
| | 35 | 2.9 | 2.7 | 2.1 | 1.6 | 1.2 | 0.7 | 0.2 |
| 8000 | -40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.3 | 3.8 | 3.1 |
| | -10 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | 0 | 6.8 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 |
| | 10 | 6.6 | 6.3 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 |
| | 15 | 5.7 | 5.4 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 |
| | 20 | 4.7 | 4.5 | 3.8 | 3.2 | 2.7 | 2.2 | 1.6 |
| | 25 | 3.9 | 3.6 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 |
| | 30 | 3.1 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 | 0.4 |
| 9000 | -40 | 6.4 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.8 |
| | -10 | 6.4 | 6.1 | 5.3 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 0 | 6.4 | 6.1 | 5.4 | 4.7 | 4.0 | 3.5 | 2.8 |
| | 10 | 5.9 | 5.6 | 4.9 | 4.2 | 3.6 | 3.1 | 2.4 |
| | 15 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 | 1.8 |
| | 20 | 4.1 | 3.8 | 3.2 | 2.7 | 2.1 | 1.7 | 1.1 |
| | 25 | 3.3 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | 0.5 |
| | 30 | 2.5 | 2.3 | 1.8 | 1.3 | 0.9 | 0.4 | 0.0 |
| 10,000 | -40 | 6.0 | 5.7 | 5.0 | 4.4 | 3.7 | 3.2 | 2.5 |
| | -5 | 6.1 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 | 2.6 |
| | 5 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | 10 | 5.2 | 4.9 | 4.2 | 3.6 | 3.1 | 2.5 | 1.9 |
| | 15 | 4.3 | 4.1 | 3.4 | 2.9 | 2.3 | 1.8 | 1.3 |
| | 20 | 3.5 | 3.2 | 2.7 | 2.1 | 1.6 | 1.2 | 0.7 |
| | 25 | 2.7 | 2.5 | 1.9 | 1.5 | 1.0 | 0.6 | 0.1 |
| | 30 | 2.0 | 1.8 | 1.3 | 0.8 | 0.4 | 0.0 | -0.4 |

TCG3_UP_0_7_07

| Wind Corrected Enroute Climb Gradient [%] | | | | |
|---|---|---|---|---|
| **FLAPS UP, 140 [KIAS], Ice Protection Off** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.1 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.7 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.2 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.8 |
| 1.9 | **2.0** | 2.1 | 2.1 | 2.3 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.9 |
| 2.8 | **3.0** | 3.1 | 3.2 | 3.5 |
| 3.2 | **3.5** | 3.6 | 3.7 | 4.0 |
| 3.7 | **4.0** | 4.1 | 4.3 | 4.6 |
| 4.1 | **4.5** | 4.6 | 4.8 | 5.2 |
| 4.6 | **5.0** | 5.2 | 5.3 | 5.7 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.3 |
| 5.5 | **6.0** | 6.2 | 6.4 | 6.8 |
| 5.9 | **6.5** | 6.7 | 7.0 | 7.4 |
| 6.4 | **7.0** | 7.2 | 7.5 | 8.0 |
| 6.8 | **7.5** | 7.8 | 8.1 | 8.5 |
| 7.3 | **8.0** | 8.3 | 8.6 | 9.1 |
| 7.7 | **8.5** | 8.8 | 9.1 | 9.7 |
| 8.1 | **9.0** | 9.3 | 9.7 | 10.2 |
| 8.6 | **9.5** | 9.8 | 10.2 | 10.8 |
| 9.0 | **10.0** | 10.4 | 10.8 | 11.4 |
| 9.5 | **10.5** | 10.9 | 11.3 | 11.9 |
| 9.9 | **11.0** | 11.4 | 11.8 | 12.5 |
| 10.4 | **11.5** | 11.9 | 12.4 | 13.0 |
| 10.8 | **12.0** | 12.4 | 12.9 | 13.6 |

ECGWC_UP_ALL_05

| Net Takeoff Climb Gradient, Final Segment [%]<br>Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| -1000 | -40 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | -30 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| | -20 | 10.0 | 9.6 | 8.6 | 7.8 | 7.0 | 6.3 | 5.5 |
| | -10 | 10.1 | 9.7 | 8.7 | 7.9 | 7.1 | 6.3 | 5.5 |
| | -5 | 10.1 | 9.7 | 8.8 | 7.9 | 7.1 | 6.4 | 5.6 |
| | 0 | 10.2 | 9.8 | 8.8 | 7.9 | 7.1 | 6.4 | 5.6 |
| | 5 | 10.2 | 9.8 | 8.8 | 8.0 | 7.2 | 6.4 | 5.6 |
| | 10 | 10.3 | 9.8 | 8.9 | 8.0 | 7.2 | 6.5 | 5.6 |
| Sea Level | -40 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | -30 | 9.6 | 9.2 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | -20 | 9.7 | 9.3 | 8.3 | 7.5 | 6.7 | 6.0 | 5.2 |
| | -10 | 9.8 | 9.4 | 8.4 | 7.6 | 6.8 | 6.1 | 5.3 |
| | -5 | 9.8 | 9.4 | 8.5 | 7.6 | 6.8 | 6.1 | 5.3 |
| | 0 | 9.8 | 9.4 | 8.5 | 7.6 | 6.9 | 6.1 | 5.3 |
| | 5 | 9.9 | 9.5 | 8.5 | 7.7 | 6.9 | 6.2 | 5.4 |
| | 10 | 9.9 | 9.5 | 8.6 | 7.7 | 6.9 | 6.2 | 5.4 |
| 1000 | -40 | 9.2 | 8.8 | 7.9 | 7.0 | 6.3 | 5.6 | 4.8 |
| | -30 | 9.2 | 8.8 | 7.9 | 7.1 | 6.4 | 5.7 | 4.9 |
| | -20 | 9.3 | 8.9 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 |
| | -10 | 9.4 | 9.0 | 8.1 | 7.3 | 6.5 | 5.8 | 5.0 |
| | -5 | 9.4 | 9.1 | 8.1 | 7.3 | 6.5 | 5.8 | 5.0 |
| | 0 | 9.5 | 9.1 | 8.2 | 7.3 | 6.6 | 5.9 | 5.1 |
| | 5 | 9.5 | 9.1 | 8.2 | 7.4 | 6.6 | 5.9 | 5.1 |
| | 10 | 9.0 | 8.6 | 7.7 | 6.9 | 6.2 | 5.5 | 4.7 |
| 2000 | -40 | 8.8 | 8.4 | 7.6 | 6.7 | 6.0 | 5.3 | 4.6 |
| | -30 | 8.9 | 8.5 | 7.6 | 6.8 | 6.1 | 5.4 | 4.6 |
| | -20 | 9.0 | 8.6 | 7.7 | 6.9 | 6.2 | 5.5 | 4.7 |
| | -10 | 9.1 | 8.7 | 7.8 | 7.0 | 6.2 | 5.5 | 4.8 |
| | -5 | 9.1 | 8.7 | 7.8 | 7.0 | 6.2 | 5.6 | 4.8 |
| | 0 | 9.1 | 8.7 | 7.8 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 5 | 9.2 | 8.8 | 7.9 | 7.0 | 6.3 | 5.6 | 4.8 |
| | 10 | 8.1 | 7.7 | 6.9 | 6.1 | 5.4 | 4.8 | 4.0 |

TCG3_UP_2_-1_02

| Net Takeoff Climb Gradient, Final Segment [%] Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 3000 | -40 | 8.5 | 8.1 | 7.3 | 6.5 | 5.7 | 5.1 | 4.3 |
| | -30 | 8.6 | 8.2 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | -20 | 8.6 | 8.3 | 7.4 | 6.6 | 5.9 | 5.2 | 4.5 |
| | -10 | 8.7 | 8.3 | 7.5 | 6.7 | 5.9 | 5.3 | 4.5 |
| | -5 | 8.7 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 0 | 8.8 | 8.4 | 7.5 | 6.7 | 6.0 | 5.3 | 4.5 |
| | 5 | 8.5 | 8.1 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 |
| | 10 | 7.2 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 | 3.4 |
| 4000 | -40 | 8.2 | 7.8 | 7.0 | 6.2 | 5.5 | 4.8 | 4.1 |
| | -30 | 8.2 | 7.9 | 7.0 | 6.2 | 5.5 | 4.9 | 4.2 |
| | -20 | 8.3 | 7.9 | 7.1 | 6.3 | 5.6 | 4.9 | 4.2 |
| | -10 | 8.4 | 8.0 | 7.1 | 6.4 | 5.6 | 5.0 | 4.2 |
| | -5 | 8.4 | 8.0 | 7.1 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 0 | 8.4 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 |
| | 5 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 10 | 6.3 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 |
| 5000 | -40 | 7.8 | 7.4 | 6.6 | 5.9 | 5.2 | 4.5 | 3.8 |
| | -30 | 7.9 | 7.5 | 6.7 | 5.9 | 5.2 | 4.6 | 3.9 |
| | -20 | 7.9 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 3.9 |
| | -10 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | -5 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | 0 | 8.0 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.0 |
| | 5 | 6.7 | 6.3 | 5.6 | 4.9 | 4.2 | 3.7 | 3.0 |
| | 10 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| 6000 | -40 | 7.5 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.6 |
| | -30 | 7.5 | 7.2 | 6.4 | 5.6 | 5.0 | 4.3 | 3.6 |
| | -20 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | -10 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | -5 | 7.6 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.7 |
| | 0 | 7.1 | 6.7 | 6.0 | 5.2 | 4.6 | 4.0 | 3.3 |
| | 5 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | 2.4 |
| | 10 | 4.6 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | 1.5 |

TCG3_UP_2_3_02

| Net Takeoff Climb Gradient, Final Segment [%]<br>Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, 140 KIAS** | | | | | | | | |
| F. ALT [ft] | Temp. [°C] | Takeoff Weight [lb] | | | | | | |
| | | **7800** | **8000** | **8500** | **9000** | **9500** | **10000** | **10600** |
| 7000 | -40 | 7.1 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 |
| | -30 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | -20 | 7.2 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.4 |
| | -10 | 7.2 | 6.9 | 6.1 | 5.3 | 4.7 | 4.1 | 3.4 |
| | -5 | 7.2 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 | 3.4 |
| | 0 | 6.2 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | **2.7** |
| | 5 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 | **1.8** |
| | 10 | 3.9 | 3.6 | 3.0 | 2.5 | 2.0 | 1.5 | **0.9** |
| 8000 | -40 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | -30 | 6.9 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 |
| | -20 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.1 |
| | -10 | 6.8 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | **3.1** |
| | -5 | 6.6 | 6.3 | 5.5 | 4.8 | 4.2 | 3.6 | **2.9** |
| | 0 | 5.4 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | **2.1** |
| | 5 | 4.2 | 4.0 | 3.3 | 2.8 | 2.3 | 1.8 | **1.2** |
| | 10 | 3.2 | 2.9 | 2.4 | 1.8 | 1.4 | 0.9 | **0.4** |
| 9000 | -40 | 6.5 | 6.2 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | -30 | 6.5 | 6.2 | 5.4 | 4.8 | 4.1 | 3.5 | 2.9 |
| | -20 | 6.5 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | **2.9** |
| | -10 | 6.4 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | **2.8** |
| | -5 | 5.8 | 5.5 | 4.8 | 4.1 | 3.5 | 3.0 | **2.3** |
| | 0 | 4.6 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | **1.5** |
| | 5 | 3.5 | 3.3 | 2.7 | 2.2 | 1.7 | 1.2 | **0.7** |
| | 10 | 2.5 | 2.3 | 1.7 | 1.3 | 0.8 | **0.4** | **-0.1** |
| 10,000 | -40 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -30 | 6.1 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | **2.6** |
| | -20 | 6.1 | 5.8 | 5.0 | 4.4 | 3.8 | 3.2 | **2.6** |
| | -10 | 6.1 | 5.8 | 5.0 | 4.4 | 3.8 | 3.2 | **2.6** |
| | -5 | 5.0 | 4.7 | 4.0 | 3.4 | 2.9 | 2.4 | **1.8** |
| | 0 | 3.9 | 3.6 | 3.0 | 2.5 | 1.9 | 1.5 | **0.9** |
| | 5 | 2.8 | 2.6 | 2.0 | 1.5 | 1.1 | **0.6** | **0.2** |
| | 10 | 1.8 | 1.6 | 1.2 | 0.7 | **0.3** | **-0.1** | **-0.5** |

TCG3_UP_2_7_02

| Wind Corrected Enroute Climb Gradient [%] | | | | |
|---|---|---|---|---|
| **FLAPS UP, 140 [KIAS], Ice Protection On** | | | | |
| Tailwind | | Headwind | | |
| 10 | ◄ REF [0] ► | 10 | 20 | 30 |
| 0.1 | **0.0** | 0.0 | 0.0 | 0.0 |
| 0.5 | **0.5** | 0.5 | 0.5 | 0.5 |
| 1.0 | **1.0** | 1.0 | 1.0 | 1.0 |
| 1.4 | **1.5** | 1.5 | 1.6 | 1.6 |
| 1.9 | **2.0** | 2.1 | 2.1 | 2.2 |
| 2.3 | **2.5** | 2.6 | 2.6 | 2.7 |
| 2.8 | **3.0** | 3.1 | 3.2 | 3.3 |
| 3.2 | **3.5** | 3.6 | 3.7 | 3.9 |
| 3.6 | **4.0** | 4.1 | 4.3 | 4.4 |
| 4.1 | **4.5** | 4.7 | 4.8 | 5.0 |
| 4.5 | **5.0** | 5.2 | 5.4 | 5.6 |
| 5.0 | **5.5** | 5.7 | 5.9 | 6.1 |
| 5.4 | **6.0** | 6.2 | 6.5 | 6.7 |
| 5.9 | **6.5** | 6.7 | 7.0 | 7.3 |
| 6.3 | **7.0** | 7.3 | 7.5 | 7.8 |
| 6.8 | **7.5** | 7.8 | 8.1 | 8.4 |
| 7.2 | **8.0** | 8.3 | 8.6 | 9.0 |
| 7.7 | **8.5** | 8.8 | 9.2 | 9.5 |
| 8.1 | **9.0** | 9.3 | 9.7 | 10.1 |
| 8.6 | **9.5** | 9.9 | 10.3 | 10.7 |
| 9.0 | **10.0** | 10.4 | 10.8 | 11.2 |
| 9.4 | **10.5** | 10.9 | 11.3 | 11.8 |
| 9.9 | **11.0** | 11.4 | 11.9 | 12.4 |
| 10.3 | **11.5** | 11.9 | 12.4 | 12.9 |
| 10.8 | **12.0** | 12.5 | 13.0 | 13.5 |

ECGWC_UP_2_03

# OBSTACLE CLEARANCE

## Obstacle Clearance Procedure

1. Prior to determining obstacle clearance information, determine the takeoff data for the desired weight. (Configuration, TOFL, airport altitude, temperature, wind)
2. Determine the minimum climb gradient for departure. (Min Grad = Obstacle Height / (Rwy Length – TOFL + Distance to Obstacle from DER).
3. Determine the height of the obstacle (Clearance Height MSL).
4. Convert the Clearance Height to pressure altitude using the Height and Temperature in the Pressure Altitude table.

   **NOTE** Temperature decreases 1°C per 500 ft altitude.

5. Determine the climb gradient at the pressure altitude of the obstacle.
6. Correct the climb gradient for wind.
7. Compare the corrected climb gradient to the minimum climb gradient.
   i) If the corrected climb gradient is equal to or greater than the minimum climb gradient, the aircraft meets the performance requirement.
   ii) If the corrected climb gradient is less than the minimum climb gradient, the aircraft does NOT meet the performance requirement and configuration must be changed to meet the requirement. (Less weight, alternate flap setting, alternate runway).
8. Determine indicated altitude at Clearance Height.
   i) Convert Airport Elevation to pressure altitude using the Pressure Altitude table. Do not use altimeter reading for this.
   ii) Subtract the airport pressure altitude (B) from the pressure altitude of the obstacle (M).
   iii) Add the result to the airport elevation (A) to get indicated altitude at the obstacle height. This assumes the correct baro-setting on the altimeter and represents the minimum level-off height

The example worksheet shows a situation that meets the performance requirement after an engine failure.

**Obstacle Clearance Worksheet**

| | | | |
|---|---|---|---|
| Step 1 | A | Airport Elevation | |
| | B | Airport Pressure Altitude from Table | |
| | C | Airport Temperature | |
| | D | Airport Winds | |
| | E | Available Runway Length (ft) | |
| | F | Obstacle Height Above Runway (ft) | |
| | G | Obstacle Distance from Runway (ft) | |
| | H | Takeoff Flap and Ice Protection Setting | |
| | I | Aircraft Weight | |
| | J | Corrected TOFL | |
| | | | |
| Step 2 | K | Min Grad = [F / (E - J + G)]*100 | |
| Step 3 | L | Clearance Height MSL = (A + F) | |
| Step 4 | M | CH Pressure Altitude from Table (L, C) | |
| Step 5 | N | Uncorrected Climb Gradient | |
| Step 6 | O | Corrected Climb Gradient (N, D) | |
| | | | |
| Step 7 | | Compare K and O; O ≥ K | |
| Step 8 | | Altimeter Reading at CH = (A + M - B) | |

OCW_02

## Example Worksheet

| | | | |
|---|---|---|---|
| Step 1 | A | Airport Elevation | 3000 |
| | B | Airport Pressure Altitude from Table | 3346 |
| | C | Airport Temperature | -20 |
| | D | Airport Winds | 10 kt HW |
| | E | Available Runway Length (ft) | 7000 |
| | F | Obstacle Height Above Runway (ft) | 1000 |
| | G | Obstacle Distance from Runway (ft) | 4nm x 6076 |
| | H | Takeoff Flap and Ice Protection Setting | TO/APPR, Ice Protection On |
| | I | Aircraft Weight | 10600 |
| | J | Wind Corrected TOFL | 3910 |
| | | | |
| Step 2 | K | Min Grad = [F / (E - J + G)]*100 | 3.7 |
| Step 3 | L | Clearance Height MSL = (A + F) | 4000 |
| Step 4 | M | CH Pressure Altitude from Table (L, C) | 4428 |
| Step 5 | N | Uncorrected Climb Gradient | 3.9 |
| Step 6 | O | Corrected Climb Gradient (N, D) | 4.0 |
| | | | |
| Step 7 | | Compare K and O; O ≥ K | 4.0 > 3.7 |
| Step 8 | | Altimeter Reading at CH = (A + M - B) | 4082 |

OCE_02

## Airport Pressure Altitude Conversion

To convert from Airport Elevation to Pressure Altitude, find, in bold face numbers in the first column, the number representing the airport elevation to be converted. The equivalent pressure altitude is read in the adjacent column headed temperature.

For example, for an airport with an elevation of 900 feet and a temperature of 0 °C, read 945 feet pressure altitude from the table.

| Ht [ft MSL] | Pressure Altitude [feet] Ambient Temperature °C | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -40 | -20 | 0 | 10 | 20 | 30 | 40 | 55 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | 124 | 114 | 106 | 102 | 98 | 95 | 92 | 88 |
| 200 | 247 | 228 | 211 | 203 | 196 | 190 | 184 | 175 |
| 300 | 370 | 341 | 316 | 305 | 295 | 285 | 276 | 263 |
| 400 | 494 | 455 | 421 | 406 | 392 | 379 | 367 | 350 |
| 500 | 617 | 568 | 526 | 507 | 490 | 474 | 459 | 438 |
| 600 | 739 | 681 | 631 | 609 | 588 | 568 | 550 | 525 |
| 700 | 862 | 794 | 736 | 709 | 685 | 663 | 642 | 612 |
| 800 | 984 | 907 | 840 | 810 | 783 | 757 | 733 | 699 |
| 900 | 1107 | 1019 | 945 | 911 | 880 | 851 | 824 | 786 |
| 1000 | 1229 | 1132 | 1049 | 1011 | 977 | 945 | 915 | 873 |
| 1100 | 1351 | 1244 | 1153 | 1112 | 1074 | 1038 | 1006 | 959 |
| 1200 | 1472 | 1356 | 1257 | 1212 | 1171 | 1132 | 1097 | 1046 |
| 1300 | 1594 | 1468 | 1361 | 1312 | 1268 | 1226 | 1187 | 1133 |
| 1400 | 1715 | 1580 | 1464 | 1412 | 1365 | 1319 | 1278 | 1219 |
| 1500 | 1836 | 1691 | 1568 | 1511 | 1461 | 1412 | 1368 | 1305 |
| 1600 | 1957 | 1803 | 1671 | 1611 | 1557 | 1505 | 1458 | 1391 |
| 1700 | 2078 | 1914 | 1774 | 1710 | 1654 | 1598 | 1548 | 1477 |
| 1800 | 2199 | 2025 | 1877 | 1810 | 1750 | 1691 | 1638 | 1563 |
| 1900 | 2319 | 2136 | 1980 | 1909 | 1846 | 1784 | 1728 | 1649 |
| 2000 | 2439 | 2247 | 2083 | 2008 | 1941 | 1876 | 1818 | 1735 |
| 2100 | 2559 | 2358 | 2186 | 2107 | 2037 | 1969 | 1908 | 1820 |
| 2200 | 2679 | 2468 | 2288 | 2205 | 2133 | 2061 | 1997 | 1906 |
| 2300 | 2799 | 2578 | 2390 | 2304 | 2228 | 2153 | 2087 | 1991 |
| 2400 | 2918 | 2689 | 2493 | 2402 | 2323 | 2245 | 2176 | 2077 |
| 2500 | 3038 | 2799 | 2595 | 2500 | 2419 | 2337 | 2265 | 2162 |
| 2600 | 3157 | 2908 | 2696 | 2599 | 2514 | 2429 | 2354 | 2247 |
| 2700 | 3276 | 3018 | 2798 | 2697 | 2609 | 2521 | 2443 | 2332 |
| 2800 | 3395 | 3128 | 2900 | 2795 | 2703 | 2612 | 2532 | 2417 |
| 2900 | 3513 | 3237 | 3001 | 2893 | 2798 | 2704 | 2621 | 2502 |

FPPA_0_03

| Ht [ft MSL] | Pressure Altitude [feet] Ambient Temperature °C | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -40 | -20 | 0 | 10 | 20 | 30 | 40 | 55 |
| **3000** | 3632 | 3346 | 3103 | 2991 | 2892 | 2795 | 2709 | 2586 |
| **3100** | 3750 | 3455 | 3204 | 3088 | 2987 | 2887 | 2798 | 2671 |
| **3200** | 3868 | 3564 | 3305 | 3186 | 3081 | 2978 | 2886 | 2755 |
| **3300** | 3986 | 3672 | 3406 | 3283 | 3175 | 3069 | 2974 | 2839 |
| **3400** | 4103 | 3781 | 3506 | 3381 | 3269 | 3160 | 3062 | 2924 |
| **3500** | 4221 | 3889 | 3607 | 3478 | 3363 | 3251 | 3150 | 3008 |
| **3600** | 4338 | 3997 | 3707 | 3575 | 3457 | 3342 | 3238 | 3092 |
| **3700** | 4455 | 4105 | 3807 | 3672 | 3550 | 3432 | 3326 | 3176 |
| **3800** | 4572 | 4213 | 3908 | 3768 | 3644 | 3523 | 3414 | 3259 |
| **3900** | 4689 | 4321 | 4007 | 3865 | 3737 | 3613 | 3501 | 3343 |
| **4000** | 4805 | 4428 | 4107 | 3962 | 3830 | 3704 | 3589 | 3427 |
| **4100** | 4921 | 4536 | 4207 | 4058 | 3923 | 3794 | 3676 | 3510 |
| **4200** | 5038 | 4643 | 4306 | 4154 | 4016 | 3884 | 3763 | 3594 |
| **4300** | 5154 | 4750 | 4406 | 4250 | 4109 | 3974 | 3850 | 3677 |
| **4400** | 5269 | 4857 | 4505 | 4346 | 4201 | 4064 | 3937 | 3760 |
| **4500** | 5385 | 4963 | 4604 | 4442 | 4294 | 4153 | 4024 | 3843 |
| **4600** | 5500 | 5070 | 4703 | 4538 | 4386 | 4243 | 4110 | 3926 |
| **4700** | 5615 | 5176 | 4802 | 4633 | 4479 | 4332 | 4197 | 4009 |
| **4800** | 5730 | 5282 | 4900 | 4729 | 4571 | 4422 | 4283 | 4091 |
| **4900** | 5845 | 5388 | 4999 | 4824 | 4663 | 4511 | 4370 | 4174 |
| **5000** | 5960 | 5494 | 5097 | 4919 | 4754 | 4600 | 4456 | 4256 |
| **5100** | 6074 | 5599 | 5195 | 5014 | 4846 | 4689 | 4542 | 4339 |
| **5200** | 6188 | 5705 | 5293 | 5109 | 4938 | 4778 | 4628 | 4421 |
| **5300** | 6302 | 5810 | 5391 | 5204 | 5029 | 4866 | 4713 | 4503 |
| **5400** | 6416 | 5915 | 5489 | 5298 | 5120 | 4955 | 4799 | 4585 |
| **5500** | 6529 | 6020 | 5586 | 5393 | 5211 | 5043 | 4885 | 4667 |
| **5600** | 6643 | 6125 | 5683 | 5487 | 5302 | 5132 | 4970 | 4749 |
| **5700** | 6756 | 6229 | 5781 | 5582 | 5393 | 5220 | 5055 | 4831 |
| **5800** | 6869 | 6334 | 5878 | 5676 | 5484 | 5308 | 5141 | 4912 |
| **5900** | 6982 | 6438 | 5975 | 5770 | 5575 | 5396 | 5226 | 4994 |

FPPA_3_03

| Ht [ft MSL] | Pressure Altitude [feet] Ambient Temperature °C | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -40 | -20 | 0 | 10 | 20 | 30 | 40 | 55 |
| 6000 | 7094 | 6542 | 6071 | 5863 | 5665 | 5484 | 5311 | 5075 |
| 6100 | 7207 | 6646 | 6168 | 5957 | 5755 | 5572 | 5396 | 5156 |
| 6200 | 7319 | 6750 | 6264 | 6051 | 5846 | 5659 | 5480 | 5238 |
| 6300 | 7431 | 6853 | 6361 | 6144 | 5936 | 5747 | 5565 | 5319 |
| 6400 | 7543 | 6956 | 6457 | 6237 | 6026 | 5834 | 5649 | 5400 |
| 6500 | 7654 | 7060 | 6553 | 6330 | 6115 | 5922 | 5734 | 5480 |
| 6600 | 7766 | 7163 | 6649 | 6424 | 6205 | 6009 | 5818 | 5561 |
| 6700 | 7877 | 7265 | 6744 | 6516 | 6294 | 6096 | 5902 | 5642 |
| 6800 | 7988 | 7368 | 6840 | 6609 | 6384 | 6183 | 5986 | 5722 |
| 6900 | 8099 | 7471 | 6935 | 6702 | 6473 | 6269 | 6070 | 5803 |
| 7000 | 8209 | 7573 | 7030 | 6794 | 6562 | 6356 | 6153 | 5883 |
| 7100 | 8319 | 7675 | 7125 | 6887 | 6651 | 6443 | 6237 | 5963 |
| 7200 | 8430 | 7777 | 7220 | 6979 | 6740 | 6529 | 6321 | 6043 |
| 7300 | 8540 | 7879 | 7315 | 7071 | 6829 | 6615 | 6404 | 6123 |
| 7400 | 8649 | 7980 | 7410 | 7163 | 6917 | 6702 | 6487 | 6203 |
| 7500 | 8759 | 8082 | 7504 | 7254 | 7005 | 6788 | 6570 | 6283 |
| 7600 | 8869 | 8183 | 7599 | 7346 | 7094 | 6874 | 6653 | 6362 |
| 7700 | 8979 | 8285 | 7693 | 7438 | 7183 | 6959 | 6737 | 6442 |
| 7800 | 9089 | 8387 | 7788 | 7529 | 7271 | 7045 | 6820 | 6521 |
| 7900 | 9199 | 8489 | 7883 | 7620 | 7360 | 7131 | 6903 | 6600 |
| 8000 | 9309 | 8590 | 7977 | 7711 | 7448 | 7216 | 6986 | 6680 |
| 8100 | 9419 | 8692 | 8072 | 7802 | 7536 | 7301 | 7069 | 6759 |
| 8200 | 9529 | 8793 | 8166 | 7893 | 7625 | 7387 | 7152 | 6838 |
| 8300 | 9638 | 8894 | 8260 | 7984 | 7713 | 7472 | 7235 | 6916 |
| 8400 | 9747 | 8995 | 8354 | 8074 | 7801 | 7557 | 7317 | 6995 |
| 8500 | 9856 | 9096 | 8448 | 8165 | 7888 | 7641 | 7400 | 7074 |
| 8600 | 9965 | 9197 | 8542 | 8255 | 7976 | 7726 | 7482 | 7152 |
| 8700 | 10074 | 9297 | 8635 | 8345 | 8064 | 7811 | 7565 | 7231 |
| 8800 | 10183 | 9398 | 8729 | 8435 | 8151 | 7895 | 7647 | 7309 |
| 8900 | 10291 | 9498 | 8822 | 8525 | 8238 | 7979 | 7729 | 7387 |

FPPA_6_03

| Ht [ft MSL] | Pressure Altitude [feet] Ambient Temperature °C | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -40 | -20 | 0 | 10 | 20 | 30 | 40 | 55 |
| **9000** | 10399 | 9598 | 8915 | 8615 | 8325 | 8064 | 7811 | 7465 |
| **9100** | 10507 | 9698 | 9008 | 8704 | 8412 | 8148 | 7893 | 7543 |
| **9200** | 10615 | 9798 | 9101 | 8794 | 8499 | 8232 | 7974 | 7621 |
| **9300** | 10723 | 9897 | 9194 | 8883 | 8586 | 8316 | 8056 | 7699 |
| **9400** | 10830 | 9997 | 9286 | 8972 | 8673 | 8399 | 8137 | 7776 |
| **9500** | 10938 | 10096 | 9379 | 9061 | 8759 | 8483 | 8219 | 7854 |
| **9600** | 11045 | 10195 | 9471 | 9150 | 8846 | 8566 | 8300 | 7931 |
| **9700** | 11152 | 10294 | 9563 | 9239 | 8932 | 8650 | 8381 | 8008 |
| **9800** | 11259 | 10393 | 9655 | 9327 | 9018 | 8733 | 8462 | 8086 |
| **9900** | 11365 | 10492 | 9747 | 9416 | 9104 | 8816 | 8543 | 8163 |
| **10000** | 11472 | 10590 | 9839 | 9504 | 9190 | 8899 | 8624 | 8240 |
| **10100** | 11578 | 10689 | 9931 | 9592 | 9276 | 8982 | 8705 | 8316 |
| **10200** | 11684 | 10787 | 10022 | 9681 | 9362 | 9064 | 8786 | 8393 |
| **10300** | 11790 | 10885 | 10113 | 9768 | 9447 | 9147 | 8866 | 8470 |
| **10400** | 11896 | 10983 | 10205 | 9856 | 9533 | 9229 | 8947 | 8546 |
| **10500** | 12002 | 11081 | 10296 | 9944 | 9618 | 9312 | 9027 | 8623 |
| **10600** | 12107 | 11178 | 10387 | 10031 | 9703 | 9394 | 9107 | 8699 |
| **10700** | 12212 | 11276 | 10478 | 10119 | 9789 | 9476 | 9187 | 8775 |
| **10800** | 12317 | 11373 | 10568 | 10206 | 9874 | 9558 | 9267 | 8851 |
| **10900** | 12422 | 11470 | 10659 | 10293 | 9958 | 9640 | 9347 | 8927 |
| **11000** | 12527 | 11567 | 10749 | 10380 | 10043 | 9722 | 9427 | 9003 |
| **11100** | 12631 | 11664 | 10839 | 10467 | 10128 | 9803 | 9506 | 9079 |
| **11200** | 12736 | 11760 | 10929 | 10553 | 10212 | 9885 | 9586 | 9154 |
| **11300** | 12840 | 11857 | 11019 | 10640 | 10296 | 9966 | 9665 | 9230 |
| **11400** | 12944 | 11953 | 11109 | 10726 | 10381 | 10047 | 9745 | 9305 |
| **11500** | 13048 | 12049 | 11199 | 10812 | 10465 | 10128 | 9824 | 9380 |
| **11600** | 13151 | 12145 | 11289 | 10898 | 10549 | 10209 | 9903 | 9455 |
| **11700** | 13255 | 12241 | 11378 | 10984 | 10633 | 10290 | 9982 | 9531 |
| **11800** | 13358 | 12337 | 11467 | 11070 | 10716 | 10371 | 10061 | 9605 |
| **11900** | 13461 | 12433 | 11556 | 11156 | 10800 | 10451 | 10139 | 9680 |
| **12000** | 13564 | 12528 | 11645 | 11241 | 10883 | 10532 | 10218 | 9755 |

FPPA_9_03

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| -1000 | -40 | 10.4 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 |
| | 15 | 10.7 | 9.8 | 8.9 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 |
| | 20 | 10.7 | 9.8 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.4 |
| | 25 | 10.7 | 9.9 | 9.0 | 8.2 | 7.5 | 6.7 | 6.0 | 5.4 |
| | 30 | 10.1 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 |
| | 35 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.0 |
| | 40 | 7.7 | 7.0 | 6.2 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 |
| | 45 | 6.5 | 5.8 | 5.0 | 4.4 | 3.7 | 3.2 | 2.6 | 2.1 |
| | 50 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.2 | 1.7 | 1.2 |
| | 55 | 4.0 | 3.4 | 2.8 | 2.2 | 1.7 | 1.2 | 0.8 | 0.3 |
| Sea Level | -40 | 10.3 | 9.4 | 8.6 | 7.9 | 7.1 | 6.4 | 5.7 | 5.1 |
| | 15 | 10.6 | 9.7 | 8.9 | 8.1 | 7.4 | 6.6 | 5.9 | 5.3 |
| | 20 | 10.6 | 9.8 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.3 |
| | 25 | 10.7 | 9.8 | 8.9 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 |
| | 30 | 9.6 | 8.7 | 7.9 | 7.2 | 6.4 | 5.7 | 5.1 | 4.4 |
| | 35 | 8.4 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 |
| | 40 | 7.2 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 |
| | 45 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.2 | 1.7 |
| | 50 | 4.6 | 4.0 | 3.3 | 2.8 | 2.2 | 1.7 | 1.2 | 0.8 |
| | 55 | 3.4 | 2.8 | 2.3 | 1.7 | 1.2 | 0.8 | 0.3 | -0.1 |
| 1000 | -40 | 9.9 | 9.1 | 8.3 | 7.5 | 6.8 | 6.1 | 5.4 | 4.8 |
| | 10 | 10.2 | 9.4 | 8.5 | 7.8 | 7.0 | 6.3 | 5.6 | 5.0 |
| | 15 | 10.2 | 9.4 | 8.6 | 7.8 | 7.0 | 6.3 | 5.6 | 5.0 |
| | 20 | 10.3 | 9.4 | 8.6 | 7.8 | 7.1 | 6.3 | 5.7 | 5.0 |
| | 25 | 9.9 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 |
| | 30 | 8.8 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | 35 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | 40 | 6.4 | 5.7 | 4.9 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 |
| | 45 | 5.2 | 4.5 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 |
| | 50 | 3.9 | 3.3 | 2.7 | 2.2 | 1.6 | 1.2 | 0.7 | 0.3 |

FPCG_TO_0_-1_04

# Honda Aircraft Company



| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 2000 | -40 | 9.6 | 8.7 | 8.0 | 7.2 | 6.5 | 5.8 | 5.1 | 4.5 |
| | 10 | 9.9 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 |
| | 15 | 9.9 | 9.1 | 8.2 | 7.5 | 6.7 | 6.0 | 5.4 | 4.7 |
| | 20 | 9.9 | 9.1 | 8.3 | 7.5 | 6.8 | 6.0 | 5.4 | 4.7 |
| | 25 | 9.1 | 8.2 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 | 4.1 |
| | 30 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 |
| | 35 | 6.9 | 6.1 | 5.4 | 4.7 | 4.0 | 3.4 | 2.9 | 2.4 |
| | 40 | 5.7 | 4.9 | 4.2 | 3.6 | 3.0 | 2.5 | 2.0 | 1.5 |
| | 45 | 4.4 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 | 0.6 |
| | 50 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 | 0.6 | 0.2 | -0.2 |
| 3000 | -40 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.8 | 4.2 |
| | 5 | 9.5 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.0 | 4.4 |
| | 10 | 9.5 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.0 | 4.4 |
| | 15 | 9.6 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.1 | 4.4 |
| | 20 | 9.4 | 8.5 | 7.7 | 7.0 | 6.2 | 5.5 | 4.9 | 4.3 |
| | 25 | 8.2 | 7.4 | 6.7 | 5.9 | 5.2 | 4.6 | 4.0 | 3.4 |
| | 30 | 7.2 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 |
| | 35 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | 40 | 4.9 | 4.2 | 3.6 | 3.0 | 2.4 | 1.9 | 1.4 | 1.0 |
| | 45 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 | 0.1 |
| 4000 | -40 | 8.9 | 8.1 | 7.3 | 6.5 | 5.8 | 5.2 | 4.5 | 3.9 |
| | 5 | 9.1 | 8.3 | 7.5 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 |
| | 10 | 9.1 | 8.3 | 7.5 | 6.8 | 6.0 | 5.4 | 4.7 | 4.1 |
| | 15 | 9.2 | 8.3 | 7.5 | 6.8 | 6.0 | 5.4 | 4.7 | 4.1 |
| | 20 | 8.5 | 7.7 | 6.9 | 6.2 | 5.5 | 4.8 | 4.2 | 3.6 |
| | 25 | 7.5 | 6.6 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.8 |
| | 30 | 6.3 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 | 2.5 | 1.9 |
| | 35 | 5.2 | 4.5 | 3.8 | 3.2 | 2.7 | 2.1 | 1.6 | 1.2 |
| | 40 | 4.1 | 3.5 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 | 0.4 |
| | 45 | 3.1 | 2.5 | 1.9 | 1.4 | 1.0 | 0.5 | 0.1 | -0.3 |

FPCG_TO_0_2_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 5000 | -40 | 8.5 | 7.7 | 7.0 | 6.2 | 5.5 | 4.9 | 4.2 | 3.7 |
| | 5 | 8.7 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | 10 | 8.7 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | 15 | 8.7 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | 20 | 7.7 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 |
| | 25 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 | 2.1 |
| | 30 | 5.5 | 4.7 | 4.1 | 3.4 | 2.9 | 2.3 | 1.8 | 1.3 |
| | 35 | 4.4 | 3.7 | 3.1 | 2.6 | 2.0 | 1.5 | 1.1 | 0.6 |
| | 40 | 3.4 | 2.8 | 2.2 | 1.7 | 1.2 | 0.7 | 0.3 | -0.1 |
| | 45 | 2.4 | 1.8 | 1.3 | 0.8 | 0.4 | 0.0 | -0.4 | -0.8 |
| 6000 | -40 | 8.2 | 7.4 | 6.6 | 5.9 | 5.2 | 4.6 | 4.0 | 3.4 |
| | 0 | 8.4 | 7.6 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 | 3.5 |
| | 5 | 8.3 | 7.5 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 | 3.5 |
| | 10 | 8.3 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 | 4.0 | 3.5 |
| | 15 | 7.9 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.2 |
| | 20 | 6.8 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 | 2.3 |
| | 25 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 |
| | 30 | 4.6 | 4.0 | 3.3 | 2.8 | 2.2 | 1.7 | 1.2 | 0.8 |
| | 35 | 3.6 | 3.0 | 2.4 | 1.9 | 1.4 | 0.9 | 0.5 | 0.1 |
| | 40 | 2.6 | 2.0 | 1.5 | 1.0 | 0.6 | 0.2 | -0.3 | -0.6 |
| 7000 | -40 | 7.9 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 |
| | 0 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.8 | 3.2 |
| | 5 | 7.9 | 7.1 | 6.3 | 5.6 | 5.0 | 4.3 | 3.7 | 3.2 |
| | 10 | 7.9 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 |
| | 15 | 7.1 | 6.3 | 5.6 | 4.9 | 4.2 | 3.6 | 3.0 | 2.5 |
| | 20 | 6.0 | 5.3 | 4.6 | 3.9 | 3.3 | 2.8 | 2.2 | 1.7 |
| | 25 | 4.9 | 4.2 | 3.6 | 3.0 | 2.4 | 1.9 | 1.4 | 1.0 |
| | 30 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 | 0.6 | 0.2 |
| | 35 | 2.9 | 2.3 | 1.8 | 1.3 | 0.8 | 0.4 | -0.1 | -0.5 |
| | 40 | 1.9 | 1.4 | 0.9 | 0.4 | 0.0 | -0.4 | -0.8 | -1.2 |

FPCG_TO_0_5_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 8000 | -40 | 7.5 | 6.7 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 |
| | -5 | 7.6 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 |
| | 0 | 7.5 | 6.7 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.9 |
| | 5 | 7.5 | 6.7 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 |
| | 10 | 7.4 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 |
| | 15 | 6.2 | 5.5 | 4.8 | 4.1 | 3.5 | 2.9 | 2.4 | 1.9 |
| | 20 | 5.2 | 4.5 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 |
| | 25 | 4.1 | 3.5 | 2.9 | 2.3 | 1.8 | 1.3 | 0.8 | 0.4 |
| | 30 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 | 0.5 | 0.1 | -0.3 |
| | 35 | 2.1 | 1.6 | 1.1 | 0.7 | 0.2 | -0.2 | -0.6 | -1.0 |
| 9000 | -40 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 | 2.6 |
| | -5 | 7.2 | 6.4 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 |
| | 0 | 7.2 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 |
| | 5 | 7.1 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 | 3.1 | 2.5 |
| | 10 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 |
| | 15 | 5.4 | 4.7 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 | 1.3 |
| | 20 | 4.4 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 |
| | 25 | 3.3 | 2.7 | 2.2 | 1.7 | 1.2 | 0.7 | 0.3 | -0.1 |
| | 30 | 2.4 | 1.8 | 1.3 | 0.8 | 0.4 | 0.0 | -0.4 | -0.8 |
| | 35 | 1.4 | 0.9 | 0.5 | 0.0 | -0.4 | -0.7 | -1.1 | -1.5 |
| 10000 | -40 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 | 2.4 |
| | -5 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 |
| | 0 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 |
| | 5 | 6.7 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.8 | 2.2 |
| | 10 | 5.5 | 4.8 | 4.1 | 3.5 | 2.9 | 2.4 | 1.9 | 1.4 |
| | 15 | 4.6 | 3.9 | 3.3 | 2.7 | 2.1 | 1.6 | 1.2 | 0.7 |
| | 20 | 3.6 | 3.0 | 2.4 | 1.8 | 1.4 | 0.9 | 0.4 | 0.0 |
| | 25 | 2.6 | 2.0 | 1.5 | 1.0 | 0.6 | 0.1 | -0.3 | -0.7 |
| | 30 | 1.7 | 1.2 | 0.7 | 0.2 | -0.2 | -0.6 | -0.9 | -1.3 |
| | 35 | 0.7 | 0.3 | -0.1 | -0.5 | -0.9 | -1.3 | -1.6 | -1.9 |

FPCG_TO_0_8_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 11000 | -40 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 |
| | -10 | 6.4 | 5.6 | 4.9 | 4.3 | 3.6 | 3.1 | 2.5 | 2.0 |
| | -5 | 6.4 | 5.6 | 4.9 | 4.3 | 3.6 | 3.1 | 2.5 | 2.0 |
| | 0 | 6.4 | 5.6 | 4.9 | 4.2 | 3.6 | 3.1 | 2.5 | 2.0 |
| | 5 | 5.9 | 5.2 | 4.5 | 3.8 | 3.2 | 2.7 | 2.2 | 1.7 |
| | 10 | 4.8 | 4.1 | 3.5 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 |
| | 15 | 3.8 | 3.2 | 2.6 | 2.0 | 1.5 | 1.1 | 0.6 | 0.2 |
| | 20 | 2.8 | 2.3 | 1.7 | 1.2 | 0.8 | 0.3 | -0.1 | -0.5 |
| | 25 | 1.9 | 1.4 | 0.9 | 0.4 | 0.0 | -0.4 | -0.8 | -1.1 |
| | 30 | 1.0 | 0.5 | 0.1 | -0.3 | -0.7 | -1.1 | -1.4 | -1.8 |
| 12000 | -40 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | -10 | 6.0 | 5.3 | 4.6 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 |
| | -5 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | 0 | 6.0 | 5.3 | 4.6 | 3.9 | 3.3 | 2.8 | 2.2 | 1.7 |
| | 5 | 5.1 | 4.4 | 3.7 | 3.1 | 2.6 | 2.1 | 1.6 | 1.1 |
| | 10 | 4.0 | 3.4 | 2.8 | 2.2 | 1.7 | 1.2 | 0.8 | 0.3 |
| | 15 | 3.0 | 2.5 | 1.9 | 1.4 | 0.9 | 0.5 | 0.1 | -0.3 |
| | 20 | 2.1 | 1.6 | 1.1 | 0.6 | 0.2 | -0.2 | -0.6 | -1.0 |
| | 25 | 1.2 | 0.7 | 0.3 | -0.1 | -0.5 | -0.9 | -1.3 | -1.6 |
| | 30 | 0.4 | 0.0 | -0.5 | -0.8 | -1.2 | -1.5 | -1.9 | -2.2 |

FPCG_TO_0_11_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| -1000 | -40 | 10.4 | 9.5 | 8.7 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -30 | 10.4 | 9.6 | 8.7 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -25 | 10.4 | 9.6 | 8.8 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -20 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.5 | 5.9 | 5.2 |
| | -15 | 10.5 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.2 |
| | -10 | 10.5 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.2 |
| | -5 | 10.6 | 9.7 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.3 |
| | 0 | 10.6 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.3 |
| | 5 | 10.6 | 9.8 | 8.9 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 |
| | 10 | 10.7 | 9.8 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.4 |
| Sea Level | -40 | 10.3 | 9.5 | 8.7 | 7.9 | 7.2 | 6.4 | 5.8 | 5.1 |
| | -30 | 10.3 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.1 |
| | -25 | 10.4 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -20 | 10.4 | 9.5 | 8.7 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -15 | 10.4 | 9.6 | 8.7 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 |
| | -10 | 10.5 | 9.6 | 8.8 | 8.0 | 7.3 | 6.5 | 5.9 | 5.2 |
| | -5 | 10.5 | 9.7 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.2 |
| | 0 | 10.6 | 9.7 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.3 |
| | 5 | 10.6 | 9.7 | 8.9 | 8.1 | 7.4 | 6.6 | 5.9 | 5.3 |
| | 10 | 10.6 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.3 |
| 1000 | -40 | 9.9 | 9.1 | 8.3 | 7.5 | 6.8 | 6.1 | 5.4 | 4.8 |
| | -30 | 10.0 | 9.1 | 8.3 | 7.6 | 6.8 | 6.1 | 5.5 | 4.8 |
| | -25 | 10.0 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 |
| | -20 | 10.0 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 |
| | -15 | 10.1 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 |
| | -10 | 10.1 | 9.3 | 8.5 | 7.7 | 6.9 | 6.2 | 5.6 | 4.9 |
| | -5 | 10.2 | 9.3 | 8.5 | 7.7 | 7.0 | 6.3 | 5.6 | 5.0 |
| | 0 | 10.2 | 9.3 | 8.5 | 7.7 | 7.0 | 6.3 | 5.6 | 5.0 |
| | 5 | 10.2 | 9.4 | 8.5 | 7.8 | 7.0 | 6.3 | 5.6 | 5.0 |
| | 10 | 9.8 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 |

FPCG_TO_2_-1_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT | TEMP | Takeoff Weight [lb] | | | | | | | |
| [ft] | [°C] | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 2000 | -40 | 9.6 | 8.8 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 | 4.5 |
| | -30 | 9.7 | 8.8 | 8.0 | 7.3 | 6.6 | 5.8 | 5.2 | 4.6 |
| | -25 | 9.7 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 |
| | -20 | 9.7 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 |
| | -15 | 9.8 | 8.9 | 8.1 | 7.4 | 6.6 | 5.9 | 5.3 | 4.7 |
| | -10 | 9.8 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 |
| | -5 | 9.9 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 |
| | 0 | 9.9 | 9.0 | 8.2 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 |
| | 5 | 9.9 | 9.1 | 8.2 | 7.5 | 6.7 | 6.0 | 5.4 | 4.7 |
| | 10 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.0 |
| 3000 | -40 | 9.3 | 8.4 | 7.7 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 |
| | -30 | 9.3 | 8.5 | 7.7 | 7.0 | 6.2 | 5.6 | 4.9 | 4.3 |
| | -25 | 9.4 | 8.6 | 7.8 | 7.0 | 6.3 | 5.6 | 5.0 | 4.3 |
| | -20 | 9.4 | 8.6 | 7.8 | 7.1 | 6.3 | 5.6 | 5.0 | 4.4 |
| | -15 | 9.5 | 8.6 | 7.8 | 7.1 | 6.3 | 5.7 | 5.0 | 4.4 |
| | -10 | 9.5 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.0 | 4.4 |
| | -5 | 9.5 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.0 | 4.4 |
| | 0 | 9.5 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.1 | 4.4 |
| | 5 | 9.3 | 8.5 | 7.7 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 |
| | 10 | 8.1 | 7.3 | 6.5 | 5.8 | 5.1 | 4.5 | 3.9 | 3.3 |
| 4000 | -40 | 8.9 | 8.1 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.0 |
| | -30 | 9.0 | 8.2 | 7.4 | 6.6 | 5.9 | 5.3 | 4.6 | 4.0 |
| | -25 | 9.0 | 8.2 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 | 4.1 |
| | -20 | 9.1 | 8.2 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 | 4.1 |
| | -15 | 9.1 | 8.3 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 | 4.1 |
| | -10 | 9.1 | 8.3 | 7.5 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 |
| | -5 | 9.1 | 8.3 | 7.5 | 6.8 | 6.0 | 5.4 | 4.7 | 4.1 |
| | 0 | 9.2 | 8.3 | 7.5 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 |
| | 5 | 8.5 | 7.7 | 6.9 | 6.1 | 5.5 | 4.8 | 4.2 | 3.6 |
| | 10 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 |

FPCG_TO_2_2_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 5000 | -40 | 8.6 | 7.8 | 7.0 | 6.3 | 5.6 | 4.9 | 4.3 | 3.7 |
| | -30 | 8.6 | 7.8 | 7.1 | 6.3 | 5.6 | 5.0 | 4.3 | 3.8 |
| | -25 | 8.7 | 7.9 | 7.1 | 6.3 | 5.6 | 5.0 | 4.4 | 3.8 |
| | -20 | 8.7 | 7.9 | 7.1 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | -15 | 8.7 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | -10 | 8.8 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 |
| | -5 | 8.8 | 8.0 | 7.2 | 6.4 | 5.7 | 5.1 | 4.4 | 3.8 |
| | 0 | 8.8 | 8.0 | 7.2 | 6.4 | 5.7 | 5.1 | 4.4 | 3.8 |
| | 5 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | 10 | 6.2 | 5.5 | 4.8 | 4.1 | 3.5 | 2.9 | 2.4 | 1.9 |
| 6000 | -40 | 8.2 | 7.5 | 6.7 | 5.9 | 5.3 | 4.6 | 4.0 | 3.4 |
| | -30 | 8.3 | 7.5 | 6.7 | 6.0 | 5.3 | 4.7 | 4.1 | 3.5 |
| | -25 | 8.3 | 7.5 | 6.8 | 6.0 | 5.3 | 4.7 | 4.1 | 3.5 |
| | -20 | 8.4 | 7.6 | 6.8 | 6.0 | 5.4 | 4.7 | 4.1 | 3.5 |
| | -15 | 8.4 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 |
| | -10 | 8.4 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 |
| | -5 | 8.4 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 |
| | 0 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 |
| | 5 | 6.6 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.2 |
| | 10 | 5.3 | 4.6 | 3.9 | 3.3 | 2.7 | 2.2 | 1.7 | 1.2 |
| 7000 | -40 | 7.9 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 |
| | -30 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 |
| | -25 | 8.0 | 7.2 | 6.4 | 5.7 | 5.1 | 4.4 | 3.8 | 3.3 |
| | -20 | 8.0 | 7.3 | 6.5 | 5.7 | 5.1 | 4.4 | 3.8 | 3.3 |
| | -15 | 8.1 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.3 |
| | -10 | 8.0 | 7.3 | 6.5 | 5.7 | 5.1 | 4.4 | 3.8 | 3.3 |
| | -5 | 8.0 | 7.2 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 |
| | 0 | 7.1 | 6.2 | 5.5 | 4.8 | 4.2 | 3.6 | 3.0 | 2.5 |
| | 5 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 |
| | 10 | 4.4 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 |

FPCG_TO_2_5_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 8000 | -40 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | -30 | 7.7 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 |
| | -25 | 7.7 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 |
| | -20 | 7.7 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 |
| | -15 | 7.7 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 |
| | -10 | 7.6 | 6.8 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 |
| | -5 | 7.4 | 6.6 | 5.9 | 5.2 | 4.5 | 3.9 | 3.3 | 2.8 |
| | 0 | 6.1 | 5.4 | 4.7 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | 5 | 4.8 | 4.1 | 3.5 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 |
| | 10 | 3.5 | 2.9 | 2.3 | 1.8 | 1.3 | 0.9 | 0.4 | 0.0 |
| 9000 | -40 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 |
| | -30 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 |
| | -25 | 7.3 | 6.5 | 5.8 | 5.1 | 4.4 | 3.8 | 3.2 | 2.7 |
| | -20 | 7.3 | 6.5 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 | 2.7 |
| | -15 | 7.3 | 6.4 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 | 2.6 |
| | -10 | 7.2 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.2 | 2.6 |
| | -5 | 6.5 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 |
| | 0 | 5.2 | 4.5 | 3.8 | 3.2 | 2.7 | 2.1 | 1.6 | 1.2 |
| | 5 | 3.9 | 3.3 | 2.7 | 2.2 | 1.6 | 1.2 | 0.7 | 0.3 |
| | 10 | 2.7 | 2.2 | 1.6 | 1.1 | 0.7 | 0.2 | -0.2 | -0.6 |
| 10000 | -40 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 | 2.4 |
| | -30 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 | 2.4 |
| | -25 | 6.9 | 6.1 | 5.4 | 4.7 | 4.1 | 3.5 | 2.9 | 2.4 |
| | -20 | 6.8 | 6.1 | 5.3 | 4.7 | 4.0 | 3.4 | 2.9 | 2.3 |
| | -15 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 |
| | -10 | 6.8 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 |
| | -5 | 5.6 | 4.9 | 4.2 | 3.6 | 3.0 | 2.5 | 2.0 | 1.5 |
| | 0 | 4.3 | 3.7 | 3.1 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 |
| | 5 | 3.1 | 2.5 | 1.9 | 1.4 | 1.0 | 0.5 | 0.1 | -0.3 |
| | 10 | 1.9 | 1.4 | 0.9 | 0.5 | 0.0 | -0.4 | -0.7 | -1.1 |

FPCG_TO_2_8_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 11000 | -40 | 6.5 | 5.7 | 5.0 | 4.4 | 3.7 | 3.2 | 2.6 | 2.1 |
| | -30 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 |
| | -25 | 6.4 | 5.7 | 5.0 | 4.3 | 3.7 | 3.1 | 2.6 | 2.0 |
| | -20 | 6.4 | 5.6 | 4.9 | 4.3 | 3.6 | 3.1 | 2.5 | 2.0 |
| | -15 | 6.4 | 5.6 | 4.9 | 4.3 | 3.6 | 3.1 | 2.5 | 2.0 |
| | -10 | 6.0 | 5.2 | 4.5 | 3.9 | 3.3 | 2.7 | 2.2 | 1.7 |
| | -5 | 4.7 | 4.1 | 3.4 | 2.8 | 2.3 | 1.8 | 1.3 | 0.8 |
| | 0 | 3.5 | 2.8 | 2.3 | 1.8 | 1.3 | 0.8 | 0.4 | 0.0 |
| | 5 | 2.3 | 1.7 | 1.2 | 0.8 | 0.3 | -0.1 | -0.5 | -0.9 |
| | 10 | 1.2 | 0.7 | 0.3 | -0.2 | -0.6 | -0.9 | -1.3 | -1.6 |
| 12000 | -40 | 6.1 | 5.4 | 4.7 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | -30 | 6.1 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | -25 | 6.0 | 5.3 | 4.6 | 4.0 | 3.4 | 2.8 | 2.3 | 1.8 |
| | -20 | 6.0 | 5.3 | 4.6 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 |
| | -15 | 6.0 | 5.3 | 4.6 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 |
| | -10 | 5.1 | 4.4 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 |
| | -5 | 3.8 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 | 0.6 | 0.2 |
| | 0 | 2.6 | 2.1 | 1.6 | 1.1 | 0.6 | 0.2 | -0.2 | -0.6 |
| | 5 | 1.5 | 1.0 | 0.5 | 0.1 | -0.3 | -0.7 | -1.1 | -1.4 |
| | 10 | 0.5 | 0.0 | -0.4 | -0.8 | -1.1 | -1.5 | -1.8 | -2.1 |

FPCG_TO_2_11_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| -1000 | -40 | 11.9 | 11.0 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 |
| | 15 | 12.2 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 |
| | 20 | 12.2 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 |
| | 25 | 12.3 | 11.3 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.8 |
| | 30 | 11.6 | 10.7 | 9.8 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 |
| | 35 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 6.0 | 5.4 |
| | 40 | 9.2 | 8.4 | 7.7 | 7.0 | 6.3 | 5.6 | 5.0 | 4.5 |
| | 45 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 | 4.6 | 4.1 | 3.6 |
| | 50 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 | 2.7 |
| | 55 | 5.7 | 5.1 | 4.4 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 |
| Sea Level | -40 | 11.8 | 10.9 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.5 |
| | 15 | 12.1 | 11.2 | 10.4 | 9.5 | 8.8 | 8.0 | 7.3 | 6.7 |
| | 20 | 12.2 | 11.2 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.7 |
| | 25 | 12.2 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 |
| | 30 | 11.1 | 10.2 | 9.4 | 8.6 | 7.8 | 7.1 | 6.5 | 5.8 |
| | 35 | 9.9 | 9.0 | 8.3 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | 40 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.1 | 4.6 | 4.0 |
| | 45 | 7.5 | 6.7 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 |
| | 50 | 6.3 | 5.6 | 5.0 | 4.4 | 3.8 | 3.2 | 2.7 | 2.3 |
| | 55 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.3 | 1.9 | 1.4 |
| 1000 | -40 | 11.4 | 10.6 | 9.7 | 8.9 | 8.2 | 7.5 | 6.8 | 6.2 |
| | 10 | 11.7 | 10.8 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.4 |
| | 15 | 11.8 | 10.9 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.4 |
| | 20 | 11.8 | 10.9 | 10.0 | 9.2 | 8.5 | 7.7 | 7.0 | 6.4 |
| | 25 | 11.4 | 10.5 | 9.6 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 30 | 10.2 | 9.4 | 8.6 | 7.9 | 7.1 | 6.5 | 5.8 | 5.2 |
| | 35 | 9.1 | 8.3 | 7.6 | 6.8 | 6.2 | 5.5 | 4.9 | 4.4 |
| | 40 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.5 |
| | 45 | 6.8 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 | 2.6 |
| | 50 | 5.7 | 5.0 | 4.4 | 3.8 | 3.2 | 2.7 | 2.2 | 1.8 |

FPCG_UP_0_-1_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 2000 | -40 | 11.1 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.9 |
| | 10 | 11.4 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 15 | 11.4 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 20 | 11.5 | 10.6 | 9.7 | 8.9 | 8.2 | 7.4 | 6.8 | 6.1 |
| | 25 | 10.6 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 | 5.5 |
| | 30 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 |
| | 35 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 |
| | 40 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 |
| | 45 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 | 2.6 | 2.1 |
| | 50 | 5.0 | 4.4 | 3.8 | 3.3 | 2.7 | 2.2 | 1.7 | 1.3 |
| 3000 | -40 | 10.7 | 9.9 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.6 |
| | 5 | 11.0 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.8 |
| | 10 | 11.0 | 10.2 | 9.3 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 |
| | 15 | 11.1 | 10.2 | 9.4 | 8.6 | 7.8 | 7.1 | 6.5 | 5.8 |
| | 20 | 10.9 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.3 | 5.7 |
| | 25 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.4 | 4.8 |
| | 30 | 8.6 | 7.9 | 7.1 | 6.4 | 5.8 | 5.1 | 4.6 | 4.0 |
| | 35 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | 40 | 6.5 | 5.9 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.4 |
| | 45 | 5.5 | 4.8 | 4.2 | 3.7 | 3.1 | 2.6 | 2.1 | 1.6 |
| 4000 | -40 | 10.4 | 9.5 | 8.7 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 |
| | 5 | 10.6 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 |
| | 10 | 10.6 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 |
| | 15 | 10.7 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 |
| | 20 | 10.0 | 9.2 | 8.4 | 7.6 | 6.9 | 6.3 | 5.6 | 5.0 |
| | 25 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.4 | 4.8 | 4.2 |
| | 30 | 7.8 | 7.1 | 6.4 | 5.7 | 5.1 | 4.5 | 3.9 | 3.4 |
| | 35 | 6.8 | 6.1 | 5.5 | 4.8 | 4.2 | 3.7 | 3.1 | 2.7 |
| | 40 | 5.8 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.4 | 1.9 |
| | 45 | 4.9 | 4.2 | 3.7 | 3.1 | 2.6 | 2.1 | 1.6 | 1.2 |

FPCG_UP_0_2_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 5000 | -40 | 10.0 | 9.2 | 8.4 | 7.7 | 6.9 | 6.3 | 5.6 | 5.1 |
| | 5 | 10.2 | 9.4 | 8.6 | 7.9 | 7.1 | 6.5 | 5.8 | 5.2 |
| | 10 | 10.2 | 9.4 | 8.6 | 7.9 | 7.1 | 6.4 | 5.8 | 5.2 |
| | 15 | 10.2 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 |
| | 20 | 9.2 | 8.4 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 | 4.4 |
| | 25 | 8.1 | 7.3 | 6.6 | 6.0 | 5.3 | 4.7 | 4.1 | 3.6 |
| | 30 | 7.0 | 6.3 | 5.7 | 5.0 | 4.4 | 3.8 | 3.3 | 2.8 |
| | 35 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 | 2.6 | 2.1 |
| | 40 | 5.1 | 4.5 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 | 1.4 |
| | 45 | 4.2 | 3.6 | 3.1 | 2.5 | 2.0 | 1.5 | 1.1 | 0.7 |
| 6000 | -40 | 9.7 | 8.8 | 8.1 | 7.4 | 6.7 | 6.0 | 5.4 | 4.8 |
| | 0 | 9.9 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | 5 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | 10 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | 15 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 | 4.6 |
| | 20 | 8.3 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 |
| | 25 | 7.3 | 6.6 | 5.9 | 5.3 | 4.6 | 4.1 | 3.5 | 3.0 |
| | 30 | 6.3 | 5.6 | 5.0 | 4.4 | 3.8 | 3.2 | 2.7 | 2.3 |
| | 35 | 5.4 | 4.7 | 4.1 | 3.5 | 3.0 | 2.5 | 2.0 | 1.6 |
| | 40 | 4.4 | 3.8 | 3.3 | 2.7 | 2.2 | 1.7 | 1.3 | 0.9 |
| 7000 | -40 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.7 | 5.1 | 4.6 |
| | 0 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 |
| | 5 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 | 4.6 |
| | 10 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 | 4.6 |
| | 15 | 8.6 | 7.8 | 7.1 | 6.4 | 5.7 | 5.1 | 4.5 | 4.0 |
| | 20 | 7.6 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | 25 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.4 |
| | 30 | 5.6 | 4.9 | 4.3 | 3.7 | 3.2 | 2.6 | 2.2 | 1.7 |
| | 35 | 4.7 | 4.1 | 3.5 | 2.9 | 2.4 | 1.9 | 1.5 | 1.0 |
| | 40 | 3.8 | 3.2 | 2.7 | 2.1 | 1.7 | 1.2 | 0.8 | 0.4 |

FPCG_UP_0_5_04

Uncorrected Net Climb Gradient [%] at pressure altitude

**Flaps UP, Gear UP, Ice Protection Off, V2**

| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7800 | 8200 | 8600 | 9000 | 9400 | 9800 | 10200 | 10600 |
| 8000 | -40 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 |
| | -5 | 9.1 | 8.3 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 |
| | 0 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 |
| | 5 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.4 | 4.8 | 4.3 |
| | 10 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 | 4.7 | 4.1 |
| | 15 | 7.8 | 7.0 | 6.3 | 5.7 | 5.0 | 4.4 | 3.9 | 3.4 |
| | 20 | 6.8 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 | 2.6 |
| | 25 | 5.8 | 5.1 | 4.5 | 3.9 | 3.4 | 2.8 | 2.3 | 1.9 |
| | 30 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | 1.6 | 1.2 |
| | 35 | 4.0 | 3.4 | 2.9 | 2.4 | 1.9 | 1.4 | 1.0 | 0.6 |
| 9000 | -40 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.1 |
| | -5 | 8.6 | 7.9 | 7.1 | 6.4 | 5.8 | 5.1 | 4.6 | 4.0 |
| | 0 | 8.6 | 7.9 | 7.1 | 6.4 | 5.8 | 5.1 | 4.6 | 4.0 |
| | 5 | 8.6 | 7.8 | 7.1 | 6.4 | 5.7 | 5.1 | 4.5 | 4.0 |
| | 10 | 8.0 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.5 |
| | 15 | 7.0 | 6.3 | 5.6 | 5.0 | 4.4 | 3.8 | 3.3 | 2.8 |
| | 20 | 6.0 | 5.4 | 4.7 | 4.1 | 3.6 | 3.0 | 2.5 | 2.1 |
| | 25 | 5.1 | 4.5 | 3.9 | 3.3 | 2.8 | 2.3 | 1.8 | 1.4 |
| | 30 | 4.2 | 3.6 | 3.1 | 2.6 | 2.0 | 1.6 | 1.1 | 0.7 |
| | 35 | 3.4 | 2.8 | 2.3 | 1.8 | 1.3 | 0.9 | 0.4 | 0.1 |
| 10000 | -40 | 8.4 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.4 | 3.8 |
| | -5 | 8.3 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.8 |
| | 0 | 8.3 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.8 |
| | 5 | 8.2 | 7.4 | 6.7 | 6.0 | 5.4 | 4.8 | 4.2 | 3.7 |
| | 10 | 7.1 | 6.4 | 5.7 | 5.1 | 4.5 | 3.9 | 3.4 | 2.9 |
| | 15 | 6.2 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 | 2.7 | 2.2 |
| | 20 | 5.3 | 4.7 | 4.1 | 3.5 | 3.0 | 2.4 | 2.0 | 1.5 |
| | 25 | 4.4 | 3.8 | 3.2 | 2.7 | 2.2 | 1.7 | 1.3 | 0.8 |
| | 30 | 3.6 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 | 0.2 |
| | 35 | 2.7 | 2.2 | 1.7 | 1.2 | 0.8 | 0.3 | -0.1 | -0.4 |

FPCG_UP_0_8_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection Off, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 11000 | -40 | 8.0 | 7.2 | 6.5 | 5.9 | 5.2 | 4.6 | 4.1 | 3.5 |
| | -10 | 7.9 | 7.2 | 6.5 | 5.8 | 5.1 | 4.5 | 4.0 | 3.5 |
| | -5 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.5 |
| | 0 | 7.9 | 7.2 | 6.4 | 5.8 | 5.1 | 4.5 | 4.0 | 3.5 |
| | 5 | 7.5 | 6.7 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 |
| | 10 | 6.4 | 5.7 | 5.1 | 4.5 | 3.9 | 3.3 | 2.8 | 2.4 |
| | 15 | 5.5 | 4.9 | 4.3 | 3.7 | 3.1 | 2.6 | 2.1 | 1.7 |
| | 20 | 4.6 | 4.0 | 3.5 | 2.9 | 2.4 | 1.9 | 1.4 | 1.0 |
| | 25 | 3.8 | 3.2 | 2.7 | 2.1 | 1.7 | 1.2 | 0.8 | 0.4 |
| | 30 | 3.0 | 2.4 | 1.9 | 1.4 | 1.0 | 0.5 | 0.1 | -0.2 |
| 12000 | -40 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 | 3.3 |
| | -10 | 7.6 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | -5 | 7.6 | 6.8 | 6.2 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | 0 | 7.6 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | 5 | 6.7 | 6.0 | 5.4 | 4.7 | 4.1 | 3.6 | 3.1 | 2.6 |
| | 10 | 5.7 | 5.1 | 4.4 | 3.8 | 3.3 | 2.8 | 2.3 | 1.8 |
| | 15 | 4.8 | 4.2 | 3.6 | 3.1 | 2.5 | 2.0 | 1.6 | 1.2 |
| | 20 | 4.0 | 3.4 | 2.9 | 2.3 | 1.8 | 1.4 | 0.9 | 0.5 |
| | 25 | 3.2 | 2.6 | 2.1 | 1.6 | 1.1 | 0.7 | 0.3 | -0.1 |
| | 30 | 2.4 | 1.9 | 1.4 | 0.9 | 0.5 | 0.1 | -0.3 | -0.7 |

FPCG_UP_0_11_04

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| -1000 | -40 | 11.9 | 11.0 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.6 |
| | -30 | 12.0 | 11.0 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.6 |
| | -25 | 12.0 | 11.1 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.6 |
| | -20 | 12.0 | 11.1 | 10.2 | 9.4 | 8.7 | 7.9 | 7.2 | 6.6 |
| | -15 | 12.0 | 11.1 | 10.2 | 9.5 | 8.7 | 7.9 | 7.2 | 6.6 |
| | -10 | 12.0 | 11.1 | 10.3 | 9.5 | 8.7 | 8.0 | 7.3 | 6.6 |
| | -5 | 12.1 | 11.2 | 10.3 | 9.5 | 8.7 | 8.0 | 7.3 | 6.7 |
| | 0 | 12.1 | 11.2 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.7 |
| | 5 | 12.2 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 |
| | 10 | 12.2 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 |
| Sea Level | -40 | 11.8 | 11.0 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.5 |
| | -30 | 11.9 | 11.0 | 10.1 | 9.3 | 8.6 | 7.8 | 7.1 | 6.5 |
| | -25 | 11.9 | 11.0 | 10.2 | 9.4 | 8.6 | 7.8 | 7.2 | 6.5 |
| | -20 | 11.9 | 11.0 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 |
| | -15 | 12.0 | 11.0 | 10.2 | 9.4 | 8.6 | 7.9 | 7.2 | 6.6 |
| | -10 | 12.0 | 11.1 | 10.2 | 9.4 | 8.7 | 7.9 | 7.2 | 6.6 |
| | -5 | 12.0 | 11.1 | 10.3 | 9.5 | 8.7 | 7.9 | 7.3 | 6.6 |
| | 0 | 12.1 | 11.2 | 10.3 | 9.5 | 8.7 | 8.0 | 7.3 | 6.6 |
| | 5 | 12.1 | 11.2 | 10.3 | 9.5 | 8.8 | 8.0 | 7.3 | 6.7 |
| | 10 | 12.2 | 11.2 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.7 |
| 1000 | -40 | 11.5 | 10.6 | 9.7 | 9.0 | 8.2 | 7.5 | 6.8 | 6.2 |
| | -30 | 11.5 | 10.6 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.2 |
| | -25 | 11.5 | 10.6 | 9.8 | 9.0 | 8.3 | 7.5 | 6.9 | 6.2 |
| | -20 | 11.6 | 10.7 | 9.8 | 9.1 | 8.3 | 7.6 | 6.9 | 6.3 |
| | -15 | 11.6 | 10.7 | 9.9 | 9.1 | 8.3 | 7.6 | 6.9 | 6.3 |
| | -10 | 11.6 | 10.7 | 9.9 | 9.1 | 8.3 | 7.6 | 6.9 | 6.3 |
| | -5 | 11.7 | 10.8 | 9.9 | 9.2 | 8.4 | 7.6 | 7.0 | 6.3 |
| | 0 | 11.7 | 10.8 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.4 |
| | 5 | 11.8 | 10.8 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.4 |
| | 10 | 11.3 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 6.0 |

FPCG_UP_2_-1_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 2000 | -40 | 11.1 | 10.2 | 9.4 | 8.7 | 7.9 | 7.2 | 6.5 | 5.9 |
| | -30 | 11.2 | 10.3 | 9.5 | 8.7 | 8.0 | 7.2 | 6.6 | 6.0 |
| | -25 | 11.2 | 10.3 | 9.5 | 8.7 | 8.0 | 7.3 | 6.6 | 6.0 |
| | -20 | 11.2 | 10.4 | 9.5 | 8.8 | 8.0 | 7.3 | 6.6 | 6.0 |
| | -15 | 11.3 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.7 | 6.0 |
| | -10 | 11.3 | 10.4 | 9.6 | 8.8 | 8.1 | 7.3 | 6.7 | 6.1 |
| | -5 | 11.4 | 10.5 | 9.6 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 0 | 11.4 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 5 | 11.4 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 |
| | 10 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 6.0 | 5.4 |
| 3000 | -40 | 10.8 | 9.9 | 9.1 | 8.3 | 7.6 | 6.9 | 6.3 | 5.7 |
| | -30 | 10.8 | 10.0 | 9.2 | 8.4 | 7.7 | 7.0 | 6.3 | 5.7 |
| | -25 | 10.9 | 10.0 | 9.2 | 8.5 | 7.7 | 7.0 | 6.3 | 5.7 |
| | -20 | 10.9 | 10.1 | 9.2 | 8.5 | 7.7 | 7.0 | 6.4 | 5.8 |
| | -15 | 11.0 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.8 |
| | -10 | 11.0 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.8 |
| | -5 | 11.0 | 10.1 | 9.3 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 |
| | 0 | 11.0 | 10.2 | 9.3 | 8.6 | 7.8 | 7.1 | 6.5 | 5.8 |
| | 5 | 10.8 | 10.0 | 9.1 | 8.4 | 7.6 | 6.9 | 6.3 | 5.7 |
| | 10 | 9.6 | 8.7 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 | 4.7 |
| 4000 | -40 | 10.4 | 9.6 | 8.8 | 8.0 | 7.3 | 6.6 | 6.0 | 5.4 |
| | -30 | 10.5 | 9.6 | 8.8 | 8.1 | 7.4 | 6.7 | 6.0 | 5.4 |
| | -25 | 10.5 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 | 5.5 |
| | -20 | 10.6 | 9.7 | 8.9 | 8.2 | 7.4 | 6.7 | 6.1 | 5.5 |
| | -15 | 10.6 | 9.7 | 8.9 | 8.2 | 7.4 | 6.8 | 6.1 | 5.5 |
| | -10 | 10.6 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 |
| | -5 | 10.6 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 |
| | 0 | 10.7 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.2 | 5.6 |
| | 5 | 10.0 | 9.1 | 8.4 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 |
| | 10 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.1 |

FPCG_UP_2_2_02

Uncorrected Net Climb Gradient [%] at pressure altitude

**Flaps UP, Gear UP, Ice Protection On, V2**

| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 5000 | -40 | 10.1 | 9.2 | 8.4 | 7.7 | 7.0 | 6.3 | 5.7 | 5.1 |
| | -30 | 10.1 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 |
| | -25 | 10.2 | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 |
| | -20 | 10.2 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 |
| | -15 | 10.2 | 9.4 | 8.6 | 7.9 | 7.1 | 6.4 | 5.8 | 5.2 |
| | -10 | 10.2 | 9.4 | 8.6 | 7.9 | 7.1 | 6.5 | 5.8 | 5.2 |
| | -5 | 10.3 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.8 | 5.3 |
| | 0 | 10.3 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.8 | 5.3 |
| | 5 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.4 |
| | 10 | 7.8 | 7.0 | 6.3 | 5.7 | 5.0 | 4.4 | 3.9 | 3.4 |
| 6000 | -40 | 9.7 | 8.9 | 8.1 | 7.4 | 6.7 | 6.1 | 5.4 | 4.9 |
| | -30 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | -25 | 9.8 | 9.0 | 8.2 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 |
| | -20 | 9.9 | 9.0 | 8.3 | 7.5 | 6.8 | 6.2 | 5.5 | 5.0 |
| | -15 | 9.9 | 9.1 | 8.3 | 7.5 | 6.8 | 6.2 | 5.5 | 5.0 |
| | -10 | 9.9 | 9.1 | 8.3 | 7.6 | 6.8 | 6.2 | 5.6 | 5.0 |
| | -5 | 9.9 | 9.1 | 8.3 | 7.6 | 6.8 | 6.2 | 5.6 | 5.0 |
| | 0 | 9.4 | 8.6 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 |
| | 5 | 8.2 | 7.4 | 6.7 | 6.0 | 5.4 | 4.8 | 4.2 | 3.7 |
| | 10 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 | 2.7 |
| 7000 | -40 | 9.4 | 8.6 | 7.8 | 7.1 | 6.4 | 5.8 | 5.2 | 4.6 |
| | -30 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.7 |
| | -25 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.9 | 5.2 | 4.7 |
| | -20 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.9 | 5.3 | 4.7 |
| | -15 | 9.5 | 8.7 | 8.0 | 7.2 | 6.5 | 5.9 | 5.3 | 4.7 |
| | -10 | 9.5 | 8.7 | 8.0 | 7.2 | 6.5 | 5.9 | 5.3 | 4.7 |
| | -5 | 9.5 | 8.7 | 7.9 | 7.2 | 6.5 | 5.9 | 5.2 | 4.7 |
| | 0 | 8.6 | 7.8 | 7.0 | 6.4 | 5.7 | 5.1 | 4.5 | 4.0 |
| | 5 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.0 | 3.5 | 3.0 |
| | 10 | 6.1 | 5.4 | 4.8 | 4.2 | 3.6 | 3.0 | 2.5 | 2.1 |

FPCG_UP_2_5_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 8000 | -40 | 9.1 | 8.3 | 7.5 | 6.8 | 6.2 | 5.5 | 4.9 | 4.4 |
| | -30 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.4 |
| | -25 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 | 4.4 |
| | -20 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 | 4.4 |
| | -15 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.6 | 4.9 | 4.4 |
| | -10 | 9.1 | 8.3 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.4 |
| | -5 | 8.9 | 8.1 | 7.4 | 6.7 | 6.0 | 5.3 | 4.7 | 4.2 |
| | 0 | 7.7 | 6.9 | 6.2 | 5.6 | 4.9 | 4.4 | 3.8 | 3.3 |
| | 5 | 6.4 | 5.8 | 5.1 | 4.5 | 3.9 | 3.4 | 2.8 | 2.4 |
| | 10 | 5.3 | 4.6 | 4.0 | 3.5 | 2.9 | 2.4 | 1.9 | 1.5 |
| 9000 | -40 | 8.7 | 8.0 | 7.2 | 6.5 | 5.9 | 5.2 | 4.7 | 4.1 |
| | -30 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 | 4.7 | 4.1 |
| | -25 | 8.8 | 8.0 | 7.3 | 6.6 | 5.9 | 5.3 | 4.7 | 4.1 |
| | -20 | 8.8 | 8.0 | 7.2 | 6.5 | 5.9 | 5.2 | 4.7 | 4.1 |
| | -15 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.1 |
| | -10 | 8.7 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.1 |
| | -5 | 8.0 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.1 | 3.6 |
| | 0 | 6.8 | 6.1 | 5.5 | 4.8 | 4.2 | 3.7 | 3.1 | 2.7 |
| | 5 | 5.6 | 5.0 | 4.4 | 3.8 | 3.2 | 2.7 | 2.2 | 1.8 |
| | 10 | 4.5 | 3.9 | 3.4 | 2.8 | 2.3 | 1.8 | 1.4 | 0.9 |
| 10000 | -40 | 8.4 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 | 4.4 | 3.9 |
| | -30 | 8.4 | 7.6 | 6.9 | 6.2 | 5.6 | 5.0 | 4.4 | 3.9 |
| | -25 | 8.4 | 7.6 | 6.9 | 6.2 | 5.6 | 4.9 | 4.4 | 3.8 |
| | -20 | 8.3 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 |
| | -15 | 8.3 | 7.5 | 6.8 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 |
| | -10 | 8.3 | 7.5 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.8 |
| | -5 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 |
| | 0 | 6.0 | 5.3 | 4.7 | 4.1 | 3.5 | 3.0 | 2.5 | 2.0 |
| | 5 | 4.9 | 4.2 | 3.7 | 3.1 | 2.6 | 2.1 | 1.6 | 1.2 |
| | 10 | 3.8 | 3.2 | 2.7 | 2.2 | 1.7 | 1.2 | 0.8 | 0.4 |

FPCG_UP_2_8_02

| Uncorrected Net Climb Gradient [%] at pressure altitude | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flaps UP, Gear UP, Ice Protection On, V2** | | | | | | | | | |
| F. ALT [ft] | TEMP [°C] | Takeoff Weight [lb] | | | | | | | |
| | | **7800** | **8200** | **8600** | **9000** | **9400** | **9800** | **10200** | **10600** |
| 11000 | -40 | 8.0 | 7.3 | 6.6 | 5.9 | 5.2 | 4.6 | 4.1 | 3.6 |
| | -30 | 8.0 | 7.2 | 6.5 | 5.9 | 5.2 | 4.6 | 4.1 | 3.5 |
| | -25 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.5 |
| | -20 | 7.9 | 7.2 | 6.5 | 5.8 | 5.2 | 4.6 | 4.0 | 3.5 |
| | -15 | 7.9 | 7.2 | 6.4 | 5.8 | 5.1 | 4.5 | 4.0 | 3.5 |
| | -10 | 7.5 | 6.8 | 6.1 | 5.4 | 4.8 | 4.2 | 3.7 | 3.2 |
| | -5 | 6.4 | 5.7 | 5.1 | 4.4 | 3.9 | 3.3 | 2.8 | 2.3 |
| | 0 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.4 | 1.9 | 1.4 |
| | 5 | 4.1 | 3.5 | 3.0 | 2.5 | 2.0 | 1.5 | 1.0 | 0.6 |
| | 10 | 3.1 | 2.6 | 2.1 | 1.6 | 1.1 | 0.7 | 0.3 | -0.1 |
| 12000 | -40 | 7.6 | 6.9 | 6.2 | 5.6 | 4.9 | 4.3 | 3.8 | 3.3 |
| | -30 | 7.6 | 6.9 | 6.2 | 5.5 | 4.9 | 4.3 | 3.8 | 3.2 |
| | -25 | 7.6 | 6.8 | 6.2 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | -20 | 7.6 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | -15 | 7.6 | 6.8 | 6.1 | 5.5 | 4.9 | 4.3 | 3.7 | 3.2 |
| | -10 | 6.7 | 6.0 | 5.4 | 4.8 | 4.2 | 3.6 | 3.1 | 2.6 |
| | -5 | 5.6 | 4.9 | 4.3 | 3.7 | 3.2 | 2.6 | 2.2 | 1.7 |
| | 0 | 4.5 | 3.9 | 3.3 | 2.7 | 2.2 | 1.7 | 1.3 | 0.9 |
| | 5 | 3.4 | 2.9 | 2.3 | 1.8 | 1.4 | 0.9 | 0.5 | 0.1 |
| | 10 | 2.5 | 1.9 | 1.5 | 1.0 | 0.5 | 0.1 | -0.3 | -0.6 |

FPCG_UP_2_11_02

# ENROUTE CLIMB

**Use of enroute climb tables:**

1. Determine the airplane gross weight.
2. Obtain ambient information:
    - ambient temperature
        - Determine that the temperature is within the ambient temperature limits found in the limitations section.
    - pressure altitude
3. Using the gross weight determined in step 1, find the 1 Engine and/or 2 Engine enroute climb gradient and/or rate of climb using pages 213 through 231.

**Single Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL | 8000 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | 10.7 | 10.7 | 10.8 | 10.8 | 10.8 | 10.9 | 10.9 | 9.7 | 8.7 | 7.8 |
| | 8500 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.7 | 9.7 | 9.8 | 9.8 | 9.8 | 9.9 | 9.9 | 9.9 | 8.8 | 7.9 | 7.0 |
| | 9000 | 8.7 | 8.7 | 8.7 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 9.0 | 9.0 | 9.0 | 8.0 | 7.1 | 6.2 |
| | 9500 | 7.9 | 7.9 | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.2 | 8.2 | 8.2 | 7.2 | 6.4 | 5.6 |
| | 10000 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 | 7.2 | 7.3 | 7.3 | 7.3 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 6.5 | 5.7 | 5.0 |
| | 10500 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.6 | 6.6 | 6.6 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 5.9 | 5.1 | 4.4 |
| 5000 | 8000 | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 8.9 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 7.9 | 6.8 | 5.9 | | |
| | 8500 | 7.9 | 8.0 | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 7.1 | 6.1 | 5.2 | | |
| | 9000 | 7.2 | 7.2 | 7.2 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 6.3 | 5.4 | 4.6 | | |
| | 9500 | 6.4 | 6.5 | 6.5 | 6.5 | 6.5 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 5.7 | 4.8 | 4.0 | | |
| | 10000 | 5.8 | 5.8 | 5.8 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.0 | 4.2 | 3.5 | | |
| | 10500 | 5.2 | 5.2 | 5.2 | 5.2 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 4.5 | 3.7 | 3.0 | | |
| 10000 | 8000 | 7.2 | 7.2 | 7.2 | 7.2 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 6.1 | 5.2 | 4.4 | | | | |
| | 8500 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.4 | 4.6 | 3.8 | | | | |
| | 9000 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.6 | 5.6 | 5.6 | 5.6 | 4.8 | 4.0 | 3.2 | | | | |
| | 9500 | 5.1 | 5.1 | 5.1 | 5.1 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.2 | 3.5 | 2.7 | | | | |
| | 10000 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 3.7 | 2.9 | 2.3 | | | | |
| | 10500 | 3.9 | 4.0 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.8 | 3.9 | 3.9 | 3.2 | 2.5 | 1.8 | | | | |

1ERCG_UP_0_1_05

**Single Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15000 | 8000 | | | | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 4.6 | 3.8 | 3.0 | 2.3 |
| | 8500 | | | | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.8 | 4.8 | 4.0 | 3.2 | 2.5 | 1.8 |
| | 9000 | | | | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.2 | 4.2 | 3.4 | 2.7 | 2.0 | 1.4 |
| | 9500 | | | | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 2.9 | 2.2 | 1.6 | 1.0 |
| | 10000 | | | | 3.0 | 3.0 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 2.4 | 1.8 | 1.1 | 0.6 |
| | 10500 | | | | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.0 | 1.3 | 0.8 | 0.2 |
| 20000 | 8000 | | | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 3.4 | 2.7 | 1.9 | 1.2 | | |
| | 8500 | | | 3.6 | 3.6 | 3.6 | 3.6 | 3.7 | 3.6 | 2.9 | 2.2 | 1.5 | 0.8 | | |
| | 9000 | | | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.0 | 2.4 | 1.7 | 1.1 | 0.4 | | |
| | 9500 | | | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.0 | 1.3 | 0.7 | 0.1 | | |
| | 10000 | | | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 1.5 | 0.9 | 0.3 | -0.3 | | |
| | 10500 | | | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.1 | 0.5 | 0.0 | -0.6 | | |
| 25000 | 8000 | 3.4 | 3.4 | 3.4 | 3.5 | 3.5 | 3.1 | 2.4 | 1.8 | 1.2 | 0.6 | | | | |
| | 8500 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.6 | 1.9 | 1.4 | 0.8 | 0.2 | | | | |
| | 9000 | 2.4 | 2.4 | 2.4 | 2.4 | 2.5 | 2.1 | 1.5 | 1.0 | 0.4 | -0.1 | | | | |
| | 9500 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 1.6 | 1.1 | 0.6 | 0.1 | -0.5 | | | | |
| | 10000 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.2 | 0.7 | 0.2 | -0.3 | -0.8 | | | | |
| | 10500 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.8 | 0.3 | -0.1 | -0.6 | -1.1 | | | | |

1ERCG_UP_0_2_05

**Single Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| SL | 8000 | 1346 | 1361 | 1377 | 1393 | 1409 | 1424 | 1443 | 1462 | 1482 | 1501 | 1518 | 1535 | 1553 | 1566 | 1417 | 1281 | 1147 |
| | 8500 | 1224 | 1238 | 1252 | 1267 | 1281 | 1295 | 1312 | 1330 | 1348 | 1366 | 1381 | 1397 | 1413 | 1425 | 1285 | 1156 | 1029 |
| | 9000 | 1113 | 1125 | 1138 | 1152 | 1165 | 1177 | 1193 | 1210 | 1226 | 1243 | 1257 | 1271 | 1286 | 1297 | 1164 | 1042 | 922 |
| | 9500 | 1011 | 1022 | 1034 | 1046 | 1058 | 1070 | 1084 | 1099 | 1115 | 1130 | 1143 | 1156 | 1170 | 1180 | 1053 | 938 | 823 |
| | 10000 | 917 | 927 | 938 | 949 | 960 | 971 | 984 | 998 | 1012 | 1026 | 1038 | 1050 | 1063 | 1071 | 951 | 841 | 732 |
| | 10500 | 830 | 839 | 849 | 859 | 869 | 879 | 891 | 904 | 917 | 930 | 941 | 952 | 963 | 971 | 856 | 751 | 647 |
| 5000 | 8000 | 1227 | 1246 | 1264 | 1282 | 1298 | 1314 | 1329 | 1344 | 1358 | 1371 | 1381 | 1390 | 1231 | 1076 | 941 | | |
| | 8500 | 1108 | 1125 | 1141 | 1158 | 1173 | 1187 | 1200 | 1214 | 1227 | 1239 | 1248 | 1256 | 1106 | 960 | 831 | | |
| | 9000 | 999 | 1015 | 1030 | 1045 | 1058 | 1072 | 1084 | 1096 | 1107 | 1118 | 1127 | 1133 | 991 | 853 | 731 | | |
| | 9500 | 899 | 913 | 927 | 941 | 953 | 965 | 976 | 987 | 998 | 1008 | 1015 | 1021 | 886 | 754 | 639 | | |
| | 10000 | 807 | 820 | 832 | 845 | 856 | 867 | 877 | 887 | 897 | 906 | 912 | 917 | 789 | 663 | 553 | | |
| | 10500 | 721 | 733 | 744 | 756 | 766 | 776 | 785 | 794 | 803 | 811 | 816 | 821 | 698 | 578 | 472 | | |
| 10000 | 8000 | 1103 | 1116 | 1126 | 1134 | 1140 | 1147 | 1153 | 1162 | 1173 | 1185 | 1039 | 895 | 756 | | | | |
| | 8500 | 986 | 999 | 1007 | 1014 | 1019 | 1025 | 1030 | 1038 | 1048 | 1059 | 921 | 785 | 653 | | | | |
| | 9000 | 880 | 891 | 899 | 904 | 909 | 913 | 918 | 925 | 934 | 944 | 812 | 684 | 559 | | | | |
| | 9500 | 781 | 791 | 798 | 803 | 807 | 811 | 815 | 820 | 829 | 837 | 713 | 590 | 471 | | | | |
| | 10000 | 690 | 699 | 705 | 709 | 712 | 716 | 719 | 724 | 731 | 739 | 620 | 503 | 390 | | | | |
| | 10500 | 606 | 614 | 619 | 622 | 624 | 627 | 629 | 633 | 640 | 647 | 533 | 421 | 313 | | | | |

1ERROC_UP_0_1_05

**Single Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15000 | 8000 | | | | 914 | 925 | 937 | 949 | 961 | 973 | 985 | 839 | 695 | 556 | 426 |
| | 8500 | | | | 803 | 813 | 823 | 834 | 845 | 856 | 867 | 729 | 592 | 461 | 338 |
| | 9000 | | | | 701 | 709 | 719 | 728 | 738 | 748 | 758 | 627 | 497 | 373 | 256 |
| | 9500 | | | | 607 | 614 | 622 | 631 | 639 | 648 | 657 | 532 | 408 | 290 | 179 |
| | 10000 | | | | 519 | 525 | 532 | 540 | 547 | 555 | 563 | 444 | 326 | 213 | 107 |
| | 10500 | | | | 436 | 442 | 448 | 454 | 461 | 468 | 475 | 361 | 248 | 140 | 38 |
| 20000 | 8000 | | | 771 | 783 | 795 | 806 | 817 | 810 | 678 | 530 | 391 | 249 | | |
| | 8500 | | | 664 | 675 | 685 | 695 | 705 | 698 | 572 | 433 | 301 | 167 | | |
| | 9000 | | | 566 | 575 | 584 | 593 | 601 | 594 | 475 | 342 | 217 | 90 | | |
| | 9500 | | | 474 | 482 | 490 | 498 | 505 | 497 | 384 | 258 | 138 | 17 | | |
| | 10000 | | | 388 | 395 | 402 | 409 | 415 | 407 | 298 | 178 | 64 | -51 | | |
| | 10500 | | | 308 | 313 | 319 | 325 | 331 | 322 | 218 | 103 | -6 | -117 | | |
| 25000 | 8000 | 681 | 694 | 706 | 719 | 731 | 650 | 517 | 392 | 263 | 125 | | | | |
| | 8500 | 574 | 585 | 597 | 608 | 618 | 542 | 416 | 297 | 175 | 44 | | | | |
| | 9000 | 476 | 485 | 495 | 505 | 514 | 441 | 321 | 209 | 93 | -31 | | | | |
| | 9500 | 384 | 392 | 401 | 409 | 417 | 347 | 233 | 126 | 15 | -103 | | | | |
| | 10000 | 298 | 305 | 312 | 319 | 326 | 259 | 150 | 47 | -59 | -172 | | | | |
| | 10500 | 217 | 223 | 229 | 235 | 241 | 176 | 71 | -27 | -129 | -237 | | | | |

1ERROC_UP_0_2_05

**Single Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection On, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL | 8000 | 10.6 | 10.6 | 10.7 | 10.7 | 10.7 | 10.7 | 10.8 | 10.8 | 10.9 | 10.9 | 10.9 |
| | 8500 | 9.7 | 9.7 | 9.7 | 9.7 | 9.7 | 9.8 | 9.8 | 9.8 | 9.9 | 9.9 | 9.9 |
| | 9000 | 8.8 | 8.8 | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 9.0 | 9.0 | 9.0 | 9.0 |
| | 9500 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.2 | 8.2 | 8.2 |
| | 10000 | 7.2 | 7.2 | 7.3 | 7.3 | 7.3 | 7.3 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 |
| | 10500 | 6.5 | 6.5 | 6.6 | 6.6 | 6.6 | 6.6 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 |
| 5000 | 8000 | 8.9 | 9.0 | 9.0 | 9.0 | 9.0 | 9.1 | 9.1 | 9.1 | 9.1 | 7.8 | 6.5 |
| | 8500 | 8.1 | 8.1 | 8.1 | 8.1 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 7.0 | 5.8 |
| | 9000 | 7.3 | 7.3 | 7.3 | 7.3 | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 | 6.2 | 5.1 |
| | 9500 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.7 | 6.7 | 6.7 | 6.7 | 5.6 | 4.5 |
| | 10000 | 5.9 | 5.9 | 5.9 | 5.9 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 4.9 | 3.9 |
| | 10500 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.4 | 5.4 | 5.4 | 4.4 | 3.4 |
| 10000 | 8000 | 7.3 | 7.3 | 7.3 | 7.2 | 7.2 | 7.2 | 7.1 | 6.0 | 4.9 | 3.8 | 2.8 |
| | 8500 | 6.5 | 6.5 | 6.5 | 6.5 | 6.4 | 6.4 | 6.4 | 5.3 | 4.3 | 3.3 | 2.3 |
| | 9000 | 5.8 | 5.8 | 5.8 | 5.8 | 5.7 | 5.7 | 5.7 | 4.7 | 3.7 | 2.7 | 1.9 |
| | 9500 | 5.2 | 5.2 | 5.2 | 5.1 | 5.1 | 5.1 | 5.0 | 4.1 | 3.1 | 2.3 | 1.4 |
| | 10000 | 4.6 | 4.6 | 4.6 | 4.5 | 4.5 | 4.5 | 4.4 | 3.6 | 2.6 | 1.8 | 1.0 |
| | 10500 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 | 3.9 | 3.9 | 3.0 | 2.2 | 1.4 | 0.6 |

1ERCG_UP_2_1_02

**Single Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection On, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
| 15000 | 8000 | | | | 5.4 | 5.4 | 5.4 | 5.4 | 5.5 | 4.5 | 3.4 | 2.4 | 1.5 | 0.7 | -0.4 |
| | 8500 | | | | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 3.9 | 2.9 | 1.9 | 1.1 | 0.3 | -0.7 |
| | 9000 | | | | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 | 3.3 | 2.4 | 1.5 | 0.7 | -0.1 | -1.0 |
| | 9500 | | | | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 2.8 | 1.9 | 1.1 | 0.3 | -0.4 | -1.3 |
| | 10000 | | | | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 2.3 | 1.5 | 0.7 | -0.1 | -0.7 | -1.6 |
| | 10500 | | | | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 1.9 | 1.0 | 0.3 | -0.4 | -1.0 | -1.8 |
| 20000 | 8000 | | | 4.2 | 4.2 | 4.2 | 3.3 | 2.4 | 1.4 | 0.5 | -0.4 | -1.1 | -1.9 | | |
| | 8500 | | | 3.6 | 3.6 | 3.6 | 2.8 | 1.9 | 1.0 | 0.1 | -0.7 | -1.4 | -2.1 | | |
| | 9000 | | | 3.1 | 3.1 | 3.1 | 2.3 | 1.5 | 0.6 | -0.2 | -1.0 | -1.6 | -2.3 | | |
| | 9500 | | | 2.6 | 2.6 | 2.6 | 1.8 | 1.1 | 0.3 | -0.5 | -1.3 | -1.9 | -2.5 | | |
| | 10000 | | | 2.1 | 2.1 | 2.1 | 1.4 | 0.7 | -0.1 | -0.9 | -1.5 | -2.1 | -2.7 | | |
| | 10500 | | | 1.7 | 1.7 | 1.6 | 1.0 | 0.3 | -0.4 | -1.2 | -1.8 | -2.4 | -2.9 | | |
| 25000 | 8000 | 3.4 | 3.4 | 3.0 | 2.3 | 1.6 | 0.8 | 0.0 | -0.8 | -1.5 | -3.1 | | | | |
| | 8500 | 2.9 | 2.9 | 2.5 | 1.8 | 1.1 | 0.4 | -0.3 | -1.1 | -1.8 | -3.2 | | | | |
| | 9000 | 2.4 | 2.4 | 2.0 | 1.4 | 0.7 | 0.0 | -0.6 | -1.3 | -2.0 | -3.4 | | | | |
| | 9500 | 1.9 | 1.9 | 1.6 | 1.0 | 0.4 | -0.3 | -0.9 | -1.6 | -2.3 | -3.5 | | | | |
| | 10000 | 1.5 | 1.5 | 1.2 | 0.6 | 0.0 | -0.6 | -1.2 | -1.9 | -2.5 | -3.7 | | | | |
| | 10500 | 1.1 | 1.1 | 0.8 | 0.2 | -0.3 | -0.9 | -1.5 | -2.1 | -2.7 | -3.9 | | | | |

1ERCG_UP_2_2_02

**Single Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection On, MCT, 140 [KIAS]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
| SL | 8000 | 1346 | 1361 | 1378 | 1396 | 1414 | 1431 | 1451 | 1470 | 1488 | 1505 | 1521 |
| | 8500 | 1223 | 1237 | 1253 | 1269 | 1286 | 1301 | 1319 | 1337 | 1354 | 1369 | 1384 |
| | 9000 | 1112 | 1124 | 1138 | 1153 | 1169 | 1183 | 1199 | 1216 | 1231 | 1246 | 1259 |
| | 9500 | 1010 | 1021 | 1034 | 1048 | 1062 | 1075 | 1090 | 1105 | 1119 | 1132 | 1144 |
| | 10000 | 915 | 926 | 938 | 950 | 963 | 975 | 989 | 1003 | 1016 | 1028 | 1039 |
| | 10500 | 828 | 837 | 848 | 860 | 872 | 883 | 895 | 908 | 920 | 931 | 941 |
| 5000 | 8000 | 1240 | 1256 | 1273 | 1290 | 1306 | 1322 | 1336 | 1350 | 1361 | 1175 | 991 |
| | 8500 | 1119 | 1134 | 1150 | 1165 | 1179 | 1194 | 1206 | 1220 | 1230 | 1054 | 881 |
| | 9000 | 1009 | 1023 | 1037 | 1051 | 1064 | 1077 | 1089 | 1101 | 1110 | 944 | 779 |
| | 9500 | 909 | 921 | 934 | 946 | 959 | 970 | 981 | 992 | 1000 | 842 | 686 |
| | 10000 | 815 | 827 | 838 | 850 | 861 | 872 | 881 | 891 | 898 | 748 | 599 |
| | 10500 | 729 | 739 | 750 | 760 | 770 | 780 | 788 | 797 | 803 | 660 | 518 |
| 10000 | 8000 | 1110 | 1122 | 1131 | 1138 | 1145 | 1150 | 1156 | 986 | 807 | 637 | 478 |
| | 8500 | 992 | 1003 | 1012 | 1018 | 1023 | 1028 | 1033 | 873 | 703 | 543 | 392 |
| | 9000 | 885 | 895 | 902 | 907 | 912 | 916 | 920 | 768 | 607 | 455 | 313 |
| | 9500 | 786 | 795 | 801 | 806 | 810 | 813 | 816 | 672 | 519 | 374 | 239 |
| | 10000 | 695 | 702 | 708 | 711 | 715 | 717 | 720 | 582 | 436 | 299 | 169 |
| | 10500 | 609 | 616 | 621 | 624 | 626 | 628 | 630 | 498 | 359 | 227 | 104 |

1ERROC_UP_2_1_02

Single Engine En Route Rate of Climb [FPM]

FLAPS UP, GEAR UP, Ice Protection On, MCT, 140 [KIAS]

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15000 | 8000 | | | | 909 | 919 | 930 | 942 | 954 | 789 | 607 | 437 | 272 | 120 | -74 |
| | 8500 | | | | 798 | 808 | 817 | 828 | 838 | 683 | 510 | 350 | 195 | 51 | -133 |
| | 9000 | | | | 697 | 705 | 713 | 723 | 732 | 584 | 421 | 269 | 122 | -15 | -188 |
| | 9500 | | | | 603 | 610 | 617 | 625 | 634 | 493 | 338 | 193 | 53 | -77 | -242 |
| | 10000 | | | | 515 | 521 | 528 | 535 | 542 | 408 | 260 | 122 | -12 | -135 | -293 |
| | 10500 | | | | 433 | 438 | 444 | 450 | 457 | 328 | 187 | 55 | -73 | -192 | -342 |
| 20000 | 8000 | | | 774 | 778 | 784 | 630 | 459 | 280 | 97 | -71 | -218 | -372 | | |
| | 8500 | | | 666 | 669 | 674 | 529 | 367 | 198 | 25 | -133 | -273 | -418 | | |
| | 9000 | | | 567 | 569 | 573 | 435 | 282 | 121 | -42 | -193 | -325 | -463 | | |
| | 9500 | | | 475 | 476 | 479 | 348 | 202 | 49 | -106 | -250 | -376 | -507 | | |
| | 10000 | | | 388 | 389 | 391 | 266 | 127 | -19 | -168 | -305 | -425 | -550 | | |
| | 10500 | | | 307 | 307 | 309 | 189 | 55 | -84 | -226 | -357 | -472 | -592 | | |
| 25000 | 8000 | 683 | 694 | 616 | 470 | 325 | 165 | 8 | -163 | -333 | -671 | | | | |
| | 8500 | 575 | 585 | 511 | 373 | 236 | 84 | -64 | -226 | -387 | -705 | | | | |
| | 9000 | 476 | 485 | 414 | 283 | 153 | 9 | -133 | -286 | -438 | -740 | | | | |
| | 9500 | 384 | 391 | 323 | 198 | 74 | -63 | -197 | -343 | -489 | -775 | | | | |
| | 10000 | 297 | 303 | 238 | 118 | 0 | -131 | -260 | -399 | -538 | -810 | | | | |
| | 10500 | 215 | 221 | 158 | 43 | -71 | -196 | -319 | -453 | -585 | -846 | | | | |

1ERROC_UP_2_2_02

**All Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -40 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL | 8000 | 23.6 | 23.6 | 23.7 | 23.7 | 23.8 | 23.9 | 23.9 | 24.0 | 24.1 | 24.1 | 24.2 | 22.2 | 20.2 | 18.0 |
| | 8500 | 22.0 | 22.1 | 22.1 | 22.2 | 22.2 | 22.3 | 22.4 | 22.4 | 22.5 | 22.6 | 22.6 | 20.7 | 18.8 | 16.8 |
| | 9000 | 20.7 | 20.7 | 20.7 | 20.8 | 20.8 | 20.9 | 21.0 | 21.1 | 21.1 | 21.2 | 21.2 | 19.4 | 17.6 | 15.7 |
| | 9500 | 19.4 | 19.5 | 19.5 | 19.5 | 19.6 | 19.7 | 19.7 | 19.8 | 19.9 | 19.9 | 19.9 | 18.3 | 16.6 | 14.8 |
| | 10000 | 18.3 | 18.4 | 18.4 | 18.4 | 18.5 | 18.5 | 18.6 | 18.7 | 18.7 | 18.8 | 18.8 | 17.2 | 15.6 | 13.9 |
| | 10500 | 17.3 | 17.3 | 17.4 | 17.4 | 17.4 | 17.5 | 17.6 | 17.6 | 17.7 | 17.7 | 17.8 | 16.2 | 14.7 | 13.1 |
| 5000 | 8000 | 20.4 | 20.7 | 20.8 | 20.8 | 20.8 | 20.8 | 20.9 | 20.9 | 20.9 | 18.8 | 16.9 | 15.3 | | |
| | 8500 | 19.0 | 19.3 | 19.4 | 19.4 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 17.6 | 15.8 | 14.2 | | |
| | 9000 | 17.8 | 18.1 | 18.2 | 18.2 | 18.2 | 18.2 | 18.3 | 18.3 | 18.3 | 16.5 | 14.8 | 13.3 | | |
| | 9500 | 16.8 | 17.0 | 17.1 | 17.1 | 17.1 | 17.1 | 17.2 | 17.2 | 17.2 | 15.5 | 13.9 | 12.4 | | |
| | 10000 | 15.8 | 16.0 | 16.1 | 16.1 | 16.1 | 16.1 | 16.2 | 16.2 | 16.2 | 14.5 | 13.0 | 11.7 | | |
| | 10500 | 14.9 | 15.1 | 15.2 | 15.2 | 15.2 | 15.2 | 15.2 | 15.3 | 15.3 | 13.7 | 12.2 | 11.0 | | |
| 10000 | 8000 | 17.4 | 17.5 | 17.4 | 17.4 | 17.3 | 17.3 | 17.3 | 15.6 | 13.8 | 12.2 | | | | |
| | 8500 | 16.3 | 16.3 | 16.3 | 16.2 | 16.1 | 16.1 | 16.1 | 14.5 | 12.9 | 11.4 | | | | |
| | 9000 | 15.2 | 15.3 | 15.2 | 15.2 | 15.1 | 15.1 | 15.1 | 13.6 | 12.0 | 10.6 | | | | |
| | 9500 | 14.3 | 14.3 | 14.3 | 14.2 | 14.2 | 14.1 | 14.2 | 12.7 | 11.2 | 9.9 | | | | |
| | 10000 | 13.4 | 13.5 | 13.4 | 13.4 | 13.3 | 13.3 | 13.3 | 11.9 | 10.5 | 9.3 | | | | |
| | 10500 | 12.6 | 12.7 | 12.6 | 12.6 | 12.5 | 12.5 | 12.5 | 11.2 | 9.9 | 8.7 | | | | |
| 15000 | 8000 | 14.0 | 14.0 | 14.0 | 14.0 | 14.1 | 12.6 | 11.2 | 9.8 | | | | | | |
| | 8500 | 13.0 | 13.0 | 13.0 | 13.1 | 13.1 | 11.8 | 10.4 | 9.1 | | | | | | |
| | 9000 | 12.2 | 12.1 | 12.2 | 12.2 | 12.2 | 11.0 | 9.7 | 8.5 | | | | | | |
| | 9500 | 11.4 | 11.4 | 11.4 | 11.4 | 11.4 | 10.2 | 9.1 | 7.9 | | | | | | |
| | 10000 | 10.7 | 10.6 | 10.7 | 10.7 | 10.7 | 9.6 | 8.5 | 7.3 | | | | | | |
| | 10500 | 10.0 | 10.0 | 10.0 | 10.0 | 10.1 | 9.0 | 7.9 | 6.9 | | | | | | |

2ERCG_UP_0_1_05

**All Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20000 | 8000 | | | | | 12.0 | 12.0 | 12.0 | 12.1 | 12.1 | 12.0 | 10.5 | 9.1 | 7.8 | 6.6 |
| | 8500 | | | | | 11.1 | 11.1 | 11.2 | 11.2 | 11.2 | 11.1 | 9.8 | 8.5 | 7.2 | 6.0 |
| | 9000 | | | | | 10.4 | 10.4 | 10.4 | 10.4 | 10.5 | 10.3 | 9.1 | 7.9 | 6.7 | 5.6 |
| | 9500 | | | | | 9.7 | 9.7 | 9.7 | 9.7 | 9.8 | 9.7 | 8.5 | 7.3 | 6.2 | 5.1 |
| | 10000 | | | | | 9.0 | 9.1 | 9.1 | 9.1 | 9.1 | 9.0 | 7.9 | 6.8 | 5.7 | 4.7 |
| | 10500 | | | | | 8.5 | 8.5 | 8.5 | 8.5 | 8.6 | 8.5 | 7.4 | 6.3 | 5.3 | 4.4 |
| 25000 | 8000 | | | 10.9 | 11.0 | 11.0 | 11.1 | 11.1 | 10.0 | 8.9 | 7.7 | 6.6 | 5.5 | | |
| | 8500 | | | 10.2 | 10.2 | 10.2 | 10.3 | 10.3 | 9.2 | 8.2 | 7.1 | 6.1 | 5.0 | | |
| | 9000 | | | 9.5 | 9.5 | 9.5 | 9.5 | 9.6 | 8.6 | 7.6 | 6.6 | 5.6 | 4.6 | | |
| | 9500 | | | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 8.0 | 7.1 | 6.1 | 5.1 | 4.2 | | |
| | 10000 | | | 8.2 | 8.3 | 8.3 | 8.3 | 8.4 | 7.4 | 6.6 | 5.7 | 4.7 | 3.9 | | |
| | 10500 | | | 7.7 | 7.7 | 7.8 | 7.8 | 7.8 | 6.9 | 6.1 | 5.2 | 4.4 | 3.5 | | |
| 30000 | 8000 | 8.2 | 8.2 | 8.3 | 8.3 | 8.3 | 7.6 | 6.4 | 5.4 | 4.4 | 3.5 | | | | |
| | 8500 | 7.6 | 7.6 | 7.6 | 7.6 | 7.7 | 7.0 | 5.9 | 4.9 | 4.0 | 3.2 | | | | |
| | 9000 | 7.0 | 7.0 | 7.1 | 7.1 | 7.1 | 6.5 | 5.5 | 4.5 | 3.7 | 2.9 | | | | |
| | 9500 | 6.5 | 6.5 | 6.6 | 6.6 | 6.6 | 6.0 | 5.0 | 4.1 | 3.3 | 2.6 | | | | |
| | 10000 | 6.0 | 6.1 | 6.1 | 6.1 | 6.1 | 5.5 | 4.6 | 3.8 | 3.0 | 2.3 | | | | |
| | 10500 | 5.6 | 5.6 | 5.7 | 5.7 | 5.7 | 5.1 | 4.3 | 3.5 | 2.7 | 2.1 | | | | |

2ERCG_UP_0_2_05

**All Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -75 | -70 | -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35000 | 8000 | 8.0 | 8.0 | 8.0 | 8.0 | 7.8 | 7.0 | 6.1 | 5.1 | 4.1 | 3.2 |
| | 8500 | 7.3 | 7.3 | 7.3 | 7.3 | 7.1 | 6.4 | 5.6 | 4.6 | 3.7 | 2.8 |
| | 9000 | 6.7 | 6.7 | 6.7 | 6.7 | 6.5 | 5.8 | 5.0 | 4.1 | 3.3 | 2.4 |
| | 9500 | 6.1 | 6.1 | 6.1 | 6.1 | 6.0 | 5.3 | 4.6 | 3.7 | 2.9 | 2.1 |
| | 10000 | 5.6 | 5.6 | 5.6 | 5.6 | 5.4 | 4.8 | 4.1 | 3.3 | 2.5 | 1.7 |
| | 10500 | 5.1 | 5.1 | 5.1 | 5.1 | 5.0 | 4.4 | 3.7 | 2.9 | 2.2 | 1.4 |
| 40000 | 8000 | 5.2 | 5.2 | 5.2 | 5.2 | 4.8 | 4.1 | 3.2 | 2.4 | 1.5 | 0.7 |
| | 8500 | 4.6 | 4.7 | 4.7 | 4.6 | 4.3 | 3.6 | 2.7 | 2.0 | 1.2 | 0.4 |
| | 9000 | 4.1 | 4.1 | 4.2 | 4.1 | 3.8 | 3.1 | 2.3 | 1.6 | 0.9 | 0.1 |
| | 9500 | 3.6 | 3.7 | 3.7 | 3.6 | 3.3 | 2.7 | 1.9 | 1.3 | 0.6 | -0.2 |
| | 10000 | 3.2 | 3.2 | 3.2 | 3.2 | 2.9 | 2.3 | 1.6 | 0.9 | 0.3 | -0.4 |
| | 10500 | 2.8 | 2.8 | 2.8 | 2.8 | 2.5 | 1.9 | 1.2 | 0.6 | 0.0 | -0.6 |
| 43000 | 8000 | 3.6 | 3.6 | 3.6 | 3.5 | 3.1 | 2.4 | 1.7 | 0.9 | 0.1 | -0.7 |
| | 8500 | 3.1 | 3.1 | 3.1 | 3.0 | 2.6 | 1.9 | 1.3 | 0.6 | -0.2 | -1.0 |
| | 9000 | 2.6 | 2.6 | 2.6 | 2.5 | 2.2 | 1.5 | 0.9 | 0.3 | -0.5 | -1.2 |
| | 9500 | 2.2 | 2.2 | 2.2 | 2.1 | 1.8 | 1.2 | 0.6 | -0.1 | -0.7 | -1.5 |
| | 10000 | 1.8 | 1.8 | 1.8 | 1.7 | 1.4 | 0.8 | 0.3 | -0.4 | -1.0 | -1.7 |
| | 10500 | 1.4 | 1.4 | 1.4 | 1.3 | 1.0 | 0.5 | -0.1 | -0.6 | -1.3 | -1.9 |

2ERCG_UP_0_3_05

**All Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -40 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SL | 8000 | 4510 | 4713 | 4762 | 4818 | 4877 | 4941 | 5003 | 5062 | 5120 | 5179 | 5230 | 4837 | 4434 | 3998 |
| | 8500 | 4217 | 4406 | 4452 | 4504 | 4560 | 4620 | 4678 | 4733 | 4788 | 4843 | 4890 | 4521 | 4141 | 3730 |
| | 9000 | 3955 | 4132 | 4176 | 4224 | 4277 | 4333 | 4388 | 4440 | 4491 | 4543 | 4587 | 4238 | 3879 | 3490 |
| | 9500 | 3719 | 3886 | 3926 | 3972 | 4022 | 4074 | 4126 | 4175 | 4223 | 4272 | 4314 | 3983 | 3643 | 3274 |
| | 10000 | 3505 | 3662 | 3700 | 3744 | 3790 | 3840 | 3889 | 3935 | 3981 | 4027 | 4066 | 3752 | 3428 | 3078 |
| | 10500 | 3310 | 3458 | 3495 | 3536 | 3580 | 3627 | 3673 | 3717 | 3760 | 3804 | 3841 | 3541 | 3233 | 2899 |
| 5000 | 8000 | 4266 | 4513 | 4570 | 4622 | 4674 | 4720 | 4771 | 4823 | 4863 | 4423 | 4008 | 3639 | | |
| | 8500 | 3985 | 4216 | 4269 | 4318 | 4366 | 4409 | 4457 | 4506 | 4543 | 4128 | 3738 | 3390 | | |
| | 9000 | 3733 | 3950 | 4000 | 4046 | 4091 | 4131 | 4176 | 4222 | 4257 | 3865 | 3496 | 3167 | | |
| | 9500 | 3506 | 3710 | 3757 | 3801 | 3843 | 3881 | 3923 | 3966 | 3999 | 3627 | 3278 | 2966 | | |
| | 10000 | 3300 | 3493 | 3537 | 3578 | 3618 | 3654 | 3694 | 3734 | 3765 | 3411 | 3079 | 2782 | | |
| | 10500 | 3112 | 3295 | 3336 | 3375 | 3413 | 3447 | 3484 | 3523 | 3552 | 3215 | 2898 | 2615 | | |
| 10000 | 8000 | 4000 | 4181 | 4209 | 4235 | 4260 | 4292 | 4334 | 3941 | 3526 | 3152 | | | | |
| | 8500 | 3732 | 3900 | 3926 | 3950 | 3974 | 4003 | 4043 | 3673 | 3282 | 2929 | | | | |
| | 9000 | 3491 | 3649 | 3673 | 3695 | 3718 | 3745 | 3782 | 3432 | 3063 | 2729 | | | | |
| | 9500 | 3274 | 3422 | 3445 | 3466 | 3486 | 3512 | 3546 | 3215 | 2865 | 2548 | | | | |
| | 10000 | 3077 | 3216 | 3237 | 3257 | 3276 | 3300 | 3333 | 3017 | 2684 | 2383 | | | | |
| | 10500 | 2897 | 3029 | 3048 | 3066 | 3084 | 3107 | 3138 | 2837 | 2519 | 2232 | | | | |
| 15000 | 8000 | 3531 | 3675 | 3717 | 3763 | 3810 | 3454 | 3099 | 2739 | | | | | | |
| | 8500 | 3287 | 3421 | 3460 | 3503 | 3547 | 3211 | 2877 | 2538 | | | | | | |
| | 9000 | 3068 | 3193 | 3230 | 3270 | 3311 | 2993 | 2677 | 2357 | | | | | | |
| | 9500 | 2871 | 2987 | 3022 | 3059 | 3098 | 2797 | 2497 | 2193 | | | | | | |
| | 10000 | 2691 | 2800 | 2832 | 2867 | 2904 | 2617 | 2332 | 2043 | | | | | | |
| | 10500 | 2526 | 2629 | 2659 | 2692 | 2727 | 2453 | 2181 | 1905 | | | | | | |

2ERROC_UP_0_1_05

**All Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 |
| 20000 | 8000 | | | | | 3292 | 3338 | 3382 | 3426 | 3470 | 3465 | 3087 | 2705 | 2342 | 1977 |
| | 8500 | | | | | 3059 | 3102 | 3143 | 3184 | 3225 | 3220 | 2863 | 2503 | 2161 | 1818 |
| | 9000 | | | | | 2850 | 2890 | 2929 | 2967 | 3005 | 3000 | 2662 | 2322 | 1999 | 1674 |
| | 9500 | | | | | 2661 | 2698 | 2734 | 2770 | 2806 | 2800 | 2480 | 2158 | 1851 | 1543 |
| | 10000 | | | | | 2488 | 2523 | 2557 | 2591 | 2624 | 2619 | 2315 | 2007 | 1716 | 1422 |
| | 10500 | | | | | 2330 | 2363 | 2395 | 2426 | 2458 | 2453 | 2162 | 1869 | 1591 | 1311 |
| 25000 | 8000 | | | 3259 | 3307 | 3354 | 3403 | 3453 | 3131 | 2811 | 2476 | 2134 | 1794 | | |
| | 8500 | | | 3025 | 3070 | 3114 | 3159 | 3206 | 2902 | 2601 | 2285 | 1963 | 1642 | | |
| | 9000 | | | 2815 | 2857 | 2898 | 2940 | 2984 | 2697 | 2411 | 2112 | 1808 | 1504 | | |
| | 9500 | | | 2625 | 2664 | 2702 | 2742 | 2783 | 2510 | 2239 | 1956 | 1667 | 1379 | | |
| | 10000 | | | 2451 | 2488 | 2524 | 2561 | 2599 | 2340 | 2082 | 1812 | 1538 | 1264 | | |
| | 10500 | | | 2292 | 2327 | 2360 | 2395 | 2431 | 2184 | 1938 | 1681 | 1418 | 1157 | | |
| 30000 | 8000 | 2644 | 2689 | 2727 | 2762 | 2799 | 2591 | 2223 | 1883 | 1562 | 1258 | | | | |
| | 8500 | 2443 | 2485 | 2520 | 2553 | 2587 | 2391 | 2044 | 1723 | 1421 | 1134 | | | | |
| | 9000 | 2262 | 2301 | 2334 | 2365 | 2396 | 2210 | 1882 | 1579 | 1293 | 1021 | | | | |
| | 9500 | 2098 | 2134 | 2165 | 2193 | 2222 | 2046 | 1734 | 1447 | 1176 | 918 | | | | |
| | 10000 | 1948 | 1982 | 2010 | 2037 | 2064 | 1896 | 1599 | 1325 | 1067 | 822 | | | | |
| | 10500 | 1810 | 1842 | 1868 | 1893 | 1918 | 1757 | 1474 | 1213 | 967 | 733 | | | | |

2ERROC_UP_0_2_05

All Engine En Route Rate of Climb [FPM]

FLAPS UP, GEAR UP, Ice Protection Off, MCT, 210 / 0.57 [KIAS / MACH]

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -75 | -70 | -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35000 | 8000 | 2526 | 2560 | 2593 | 2625 | 2589 | 2364 | 2088 | 1759 | 1435 | 1108 |
| | 8500 | 2310 | 2341 | 2372 | 2401 | 2366 | 2153 | 1893 | 1583 | 1277 | 968 |
| | 9000 | 2115 | 2143 | 2171 | 2198 | 2164 | 1962 | 1716 | 1422 | 1132 | 840 |
| | 9500 | 1936 | 1962 | 1987 | 2012 | 1979 | 1787 | 1553 | 1274 | 998 | 721 |
| | 10000 | 1771 | 1795 | 1819 | 1841 | 1809 | 1626 | 1403 | 1136 | 874 | 610 |
| | 10500 | 1619 | 1641 | 1663 | 1683 | 1652 | 1477 | 1263 | 1009 | 758 | 506 |
| 40000 | 8000 | 1647 | 1674 | 1701 | 1706 | 1606 | 1361 | 1079 | 819 | 534 | 244 |
| | 8500 | 1468 | 1493 | 1517 | 1520 | 1425 | 1195 | 928 | 682 | 413 | 139 |
| | 9000 | 1304 | 1327 | 1349 | 1351 | 1260 | 1041 | 788 | 555 | 300 | 40 |
| | 9500 | 1154 | 1174 | 1193 | 1194 | 1108 | 899 | 658 | 437 | 194 | -53 |
| | 10000 | 1014 | 1032 | 1049 | 1049 | 966 | 767 | 537 | 326 | 94 | -141 |
| | 10500 | 883 | 899 | 915 | 914 | 833 | 643 | 423 | 221 | 0 | -226 |
| 43000 | 8000 | 1137 | 1153 | 1167 | 1156 | 1035 | 802 | 577 | 322 | 42 | -254 |
| | 8500 | 975 | 989 | 1002 | 990 | 875 | 654 | 442 | 200 | -64 | -344 |
| | 9000 | 826 | 838 | 849 | 837 | 726 | 517 | 316 | 86 | -164 | -430 |
| | 9500 | 688 | 698 | 707 | 694 | 589 | 389 | 197 | -21 | -260 | -512 |
| | 10000 | 558 | 567 | 574 | 561 | 460 | 269 | 85 | -123 | -351 | -592 |
| | 10500 | 437 | 444 | 449 | 436 | 338 | 155 | -21 | -221 | -438 | -669 |

2ERROC_UP_0_3_05

**All Engine En Route Gross Climb Gradient [%]**

**FLAPS UP, GEAR UP, Ice Protection On, MCT, 210/0.57 [KIAS/MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
| SL | 8000 | | 23.7 | 23.7 | 23.7 | 23.8 | 23.8 | 23.8 | 23.9 | 24.0 | 24.1 | 24.1 | 24.2 |
| | 8500 | | 22.2 | 22.2 | 22.2 | 22.2 | 22.2 | 22.3 | 22.3 | 22.4 | 22.5 | 22.6 | 22.6 |
| | 9000 | | 20.8 | 20.8 | 20.8 | 20.8 | 20.9 | 20.9 | 20.9 | 21.0 | 21.1 | 21.2 | 21.2 |
| | 9500 | | 19.5 | 19.5 | 19.6 | 19.6 | 19.6 | 19.6 | 19.7 | 19.8 | 19.8 | 19.9 | 19.9 |
| | 10000 | | 18.4 | 18.4 | 18.4 | 18.5 | 18.5 | 18.5 | 18.6 | 18.6 | 18.7 | 18.8 | 18.8 |
| | 10500 | | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.5 | 17.5 | 17.6 | 17.7 | 17.7 | 17.8 |
| 5000 | 8000 | | 20.6 | 20.7 | 20.7 | 20.8 | 20.9 | 20.9 | 21.0 | 21.0 | 21.0 | 21.1 | 19.9 |
| | 8500 | | 19.2 | 19.3 | 19.4 | 19.5 | 19.5 | 19.6 | 19.6 | 19.6 | 19.7 | 19.7 | 18.6 |
| | 9000 | | 18.0 | 18.1 | 18.2 | 18.2 | 18.3 | 18.3 | 18.4 | 18.4 | 18.4 | 18.4 | 17.4 |
| | 9500 | | 16.9 | 17.0 | 17.0 | 17.1 | 17.2 | 17.2 | 17.2 | 17.3 | 17.3 | 17.3 | 16.3 |
| | 10000 | | 15.9 | 16.0 | 16.0 | 16.1 | 16.2 | 16.2 | 16.2 | 16.3 | 16.3 | 16.3 | 15.4 |
| | 10500 | | 15.0 | 15.1 | 15.1 | 15.2 | 15.2 | 15.3 | 15.3 | 15.3 | 15.4 | 15.4 | 14.5 |
| 10000 | 8000 | | 17.6 | 17.6 | 17.7 | 17.7 | 17.6 | 17.6 | 17.5 | 17.4 | 16.5 | 14.5 | 12.7 |
| | 8500 | | 16.4 | 16.5 | 16.5 | 16.5 | 16.4 | 16.4 | 16.3 | 16.3 | 15.4 | 13.5 | 11.8 |
| | 9000 | | 15.4 | 15.4 | 15.4 | 15.4 | 15.4 | 15.3 | 15.3 | 15.2 | 14.4 | 12.6 | 11.0 |
| | 9500 | | 14.4 | 14.4 | 14.5 | 14.5 | 14.4 | 14.4 | 14.3 | 14.3 | 13.5 | 11.8 | 10.3 |
| | 10000 | | 13.5 | 13.6 | 13.6 | 13.6 | 13.5 | 13.5 | 13.5 | 13.4 | 12.7 | 11.1 | 9.6 |
| | 10500 | | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.7 | 12.7 | 12.6 | 11.9 | 10.4 | 9.0 |
| 15000 | 8000 | | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 13.5 | 11.9 | 10.3 | 8.7 | 7.3 |
| | 8500 | | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 13.1 | 12.5 | 11.0 | 9.5 | 8.1 | 6.8 |
| | 9000 | | 12.3 | 12.2 | 12.2 | 12.2 | 12.2 | 12.3 | 11.7 | 10.3 | 8.9 | 7.5 | 6.2 |
| | 9500 | | 11.5 | 11.4 | 11.4 | 11.4 | 11.5 | 11.5 | 10.9 | 9.6 | 8.2 | 7.0 | 5.8 |
| | 10000 | | 10.8 | 10.7 | 10.7 | 10.7 | 10.7 | 10.8 | 10.2 | 8.9 | 7.7 | 6.5 | 5.3 |
| | 10500 | | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 | 9.6 | 8.4 | 7.2 | 6.0 | 4.9 |
| 20000 | 8000 | 12.1 | 12.1 | 12.1 | 12.2 | 11.4 | 9.8 | 8.3 | 6.9 | 5.5 | 4.3 | | |
| | 8500 | 11.2 | 11.2 | 11.3 | 11.3 | 10.6 | 9.1 | 7.7 | 6.3 | 5.1 | 3.9 | | |
| | 9000 | 10.5 | 10.5 | 10.5 | 10.5 | 9.8 | 8.5 | 7.1 | 5.8 | 4.7 | 3.6 | | |
| | 9500 | 9.8 | 9.8 | 9.8 | 9.8 | 9.2 | 7.9 | 6.6 | 5.4 | 4.3 | 3.2 | | |
| | 10000 | 9.1 | 9.1 | 9.2 | 9.2 | 8.6 | 7.3 | 6.1 | 5.0 | 3.9 | 2.9 | | |
| | 10500 | 8.5 | 8.6 | 8.6 | 8.6 | 8.0 | 6.8 | 5.7 | 4.6 | 3.6 | 2.6 | | |

2ERCG_UP_2_1_02

| All Engine En Route Gross Climb Gradient [%] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLAPS UP, GEAR UP, Ice Protection On, MCT, 210/0.57 [KIAS/MACH] | | | | | | | | | | | | | | |
| Alt [ft] | Wt [lb] | TEMPERATURE [°C] | | | | | | | | | | | | |
| | | -75 | -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 |
| 25000 | 8000 | | | | 11.0 | 11.1 | 11.1 | 10.7 | 9.4 | 8.3 | 7.1 | 5.9 | 4.6 | 3.4 |
| | 8500 | | | | 10.2 | 10.3 | 10.3 | 10.0 | 8.7 | 7.7 | 6.5 | 5.4 | 4.2 | 3.1 |
| | 9000 | | | | 9.5 | 9.6 | 9.6 | 9.3 | 8.1 | 7.1 | 6.0 | 4.9 | 3.8 | 2.7 |
| | 9500 | | | | 8.9 | 8.9 | 8.9 | 8.6 | 7.5 | 6.6 | 5.6 | 4.5 | 3.4 | 2.5 |
| | 10000 | | | | 8.3 | 8.3 | 8.4 | 8.1 | 7.0 | 6.1 | 5.1 | 4.2 | 3.1 | 2.2 |
| | 10500 | | | | 7.8 | 7.8 | 7.8 | 7.5 | 6.6 | 5.7 | 4.7 | 3.8 | 2.8 | 1.9 |
| 30000 | 8000 | | 8.2 | 8.3 | 8.3 | 8.0 | 7.1 | 5.9 | 4.8 | 3.8 | 2.8 | 1.8 | | |
| | 8500 | | 7.6 | 7.7 | 7.7 | 7.4 | 6.6 | 5.4 | 4.4 | 3.5 | 2.5 | 1.6 | | |
| | 9000 | | 7.1 | 7.1 | 7.1 | 6.9 | 6.1 | 5.0 | 4.0 | 3.1 | 2.2 | 1.3 | | |
| | 9500 | | 6.5 | 6.6 | 6.6 | 6.4 | 5.6 | 4.6 | 3.7 | 2.8 | 2.0 | 1.1 | | |
| | 10000 | | 6.1 | 6.1 | 6.1 | 5.9 | 5.2 | 4.2 | 3.3 | 2.5 | 1.7 | 0.9 | | |
| | 10500 | | 5.6 | 5.7 | 5.7 | 5.5 | 4.8 | 3.9 | 3.0 | 2.3 | 1.5 | 0.7 | | |
| 35000 | 8000 | 8.0 | 8.0 | 7.6 | 6.9 | 5.8 | 4.8 | 3.7 | 2.7 | 1.6 | | | | |
| | 8500 | 7.3 | 7.3 | 7.0 | 6.2 | 5.3 | 4.3 | 3.3 | 2.3 | 1.3 | | | | |
| | 9000 | 6.7 | 6.7 | 6.4 | 5.7 | 4.8 | 3.9 | 2.9 | 1.9 | 1.0 | | | | |
| | 9500 | 6.1 | 6.1 | 5.8 | 5.2 | 4.3 | 3.4 | 2.5 | 1.6 | 0.7 | | | | |
| | 10000 | 5.6 | 5.6 | 5.3 | 4.7 | 3.9 | 3.1 | 2.2 | 1.3 | 0.5 | | | | |
| | 10500 | 5.1 | 5.1 | 4.9 | 4.3 | 3.5 | 2.7 | 1.9 | 1.1 | 0.2 | | | | |
| 40000 | 8000 | 5.2 | 5.1 | 4.6 | 3.7 | 2.8 | 1.9 | 0.9 | -0.5 | -1.6 | | | | |
| | 8500 | 4.7 | 4.6 | 4.1 | 3.3 | 2.4 | 1.5 | 0.5 | -0.7 | -1.8 | | | | |
| | 9000 | 4.1 | 4.0 | 3.6 | 2.8 | 2.0 | 1.2 | 0.3 | -0.9 | -2.0 | | | | |
| | 9500 | 3.7 | 3.6 | 3.1 | 2.4 | 1.6 | 0.8 | 0.0 | -1.1 | -2.1 | | | | |
| | 10000 | 3.2 | 3.1 | 2.7 | 2.0 | 1.3 | 0.5 | -0.3 | -1.3 | -2.3 | | | | |
| | 10500 | 2.8 | 2.7 | 2.3 | 1.7 | 1.0 | 0.3 | -0.5 | -1.5 | -2.4 | | | | |
| 43000 | 8000 | 3.6 | 3.4 | 2.8 | 2.0 | 1.1 | -0.1 | -1.0 | -2.1 | -2.6 | | | | |
| | 8500 | 3.1 | 2.9 | 2.3 | 1.6 | 0.7 | -0.3 | -1.3 | -1.6 | -2.4 | | | | |
| | 9000 | 2.6 | 2.5 | 1.9 | 1.2 | 0.4 | -0.6 | -1.5 | -1.8 | -2.6 | | | | |
| | 9500 | 2.2 | 2.0 | 1.5 | 0.8 | 0.1 | -0.9 | -1.7 | -2.0 | -2.7 | | | | |
| | 10000 | 1.8 | 1.6 | 1.1 | 0.5 | -0.2 | -1.1 | -1.9 | -2.2 | -2.9 | | | | |
| | 10500 | 1.4 | 1.3 | 0.8 | 0.2 | -0.5 | -1.4 | -2.1 | -2.4 | -3.0 | | | | |

2ERCG_UP_2_2_02

| All Engine En Route Rate of Climb [FPM] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FLAPS UP, GEAR UP, Ice Protection On, MCT, 210 / 0.57 [KIAS / MACH]** | | | | | | | | | | | | |
| Alt | Wt | TEMPERATURE [°C] | | | | | | | | | | |
| [ft] | [lb] | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
| SL | 8000 | 4512 | 4563 | 4614 | 4667 | 4718 | 4769 | 4831 | 4895 | 4957 | 5018 | 5075 |
| | 8500 | 4218 | 4266 | 4314 | 4363 | 4411 | 4459 | 4517 | 4577 | 4635 | 4692 | 4745 |
| | 9000 | 3956 | 4001 | 4046 | 4092 | 4136 | 4182 | 4236 | 4293 | 4347 | 4401 | 4451 |
| | 9500 | 3720 | 3761 | 3804 | 3847 | 3889 | 3932 | 3983 | 4036 | 4088 | 4138 | 4185 |
| | 10000 | 3505 | 3545 | 3585 | 3626 | 3665 | 3706 | 3754 | 3804 | 3853 | 3901 | 3945 |
| | 10500 | 3310 | 3347 | 3385 | 3424 | 3461 | 3500 | 3545 | 3593 | 3639 | 3684 | 3726 |
| 5000 | 8000 | 4284 | 4348 | 4410 | 4473 | 4532 | 4586 | 4640 | 4692 | 4742 | 4789 | 4566 |
| | 8500 | 4001 | 4061 | 4120 | 4178 | 4233 | 4284 | 4335 | 4383 | 4430 | 4474 | 4263 |
| | 9000 | 3749 | 3804 | 3860 | 3914 | 3966 | 4014 | 4061 | 4107 | 4151 | 4192 | 3993 |
| | 9500 | 3521 | 3573 | 3625 | 3677 | 3725 | 3771 | 3815 | 3858 | 3899 | 3938 | 3749 |
| | 10000 | 3314 | 3363 | 3412 | 3461 | 3507 | 3550 | 3591 | 3632 | 3671 | 3707 | 3527 |
| | 10500 | 3125 | 3172 | 3218 | 3265 | 3308 | 3348 | 3388 | 3426 | 3463 | 3497 | 3326 |
| 10000 | 8000 | 4021 | 4073 | 4117 | 4159 | 4189 | 4217 | 4243 | 4268 | 4080 | 3628 | 3191 |
| | 8500 | 3751 | 3800 | 3841 | 3880 | 3908 | 3934 | 3958 | 3981 | 3804 | 3378 | 2966 |
| | 9000 | 3509 | 3555 | 3593 | 3630 | 3656 | 3680 | 3703 | 3724 | 3556 | 3154 | 2765 |
| | 9500 | 3291 | 3334 | 3370 | 3404 | 3429 | 3451 | 3472 | 3492 | 3333 | 2951 | 2582 |
| | 10000 | 3093 | 3133 | 3167 | 3199 | 3222 | 3244 | 3263 | 3281 | 3130 | 2767 | 2416 |
| | 10500 | 2912 | 2950 | 2982 | 3012 | 3034 | 3054 | 3072 | 3089 | 2945 | 2599 | 2264 |
| 15000 | 8000 | 3544 | 3572 | 3606 | 3646 | 3687 | 3730 | 3590 | 3192 | 2795 | 2399 | 2032 |
| | 8500 | 3299 | 3325 | 3357 | 3394 | 3432 | 3472 | 3341 | 2966 | 2591 | 2218 | 1872 |
| | 9000 | 3079 | 3103 | 3133 | 3167 | 3204 | 3241 | 3116 | 2762 | 2408 | 2055 | 1728 |
| | 9500 | 2881 | 2903 | 2931 | 2963 | 2997 | 3032 | 2913 | 2577 | 2241 | 1907 | 1597 |
| | 10000 | 2700 | 2721 | 2747 | 2777 | 2809 | 2842 | 2729 | 2409 | 2090 | 1772 | 1476 |
| | 10500 | 2535 | 2554 | 2579 | 2607 | 2637 | 2668 | 2560 | 2255 | 1951 | 1647 | 1366 |

2ERROC_UP_2_1_02

**All Engine En Route Rate of Climb [FPM]**

**FLAPS UP, GEAR UP, Ice Protection On, MCT, 210 / 0.57 [KIAS / MACH]**

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 | -25 | -20 | -15 | -10 | -5 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20000 | 8000 | | | | | 3308 | 3352 | 3396 | 3440 | 3255 | 2838 | 2433 | 2029 | 1648 | 1292 |
| | 8500 | | | | | 3074 | 3115 | 3156 | 3197 | 3023 | 2629 | 2248 | 1867 | 1508 | 1173 |
| | 9000 | | | | | 2864 | 2902 | 2940 | 2978 | 2814 | 2442 | 2081 | 1721 | 1381 | 1065 |
| | 9500 | | | | | 2674 | 2709 | 2745 | 2781 | 2624 | 2271 | 1929 | 1588 | 1266 | 965 |
| | 10000 | | | | | 2500 | 2533 | 2567 | 2601 | 2452 | 2116 | 1791 | 1466 | 1160 | 874 |
| | 10500 | | | | | 2342 | 2373 | 2404 | 2436 | 2294 | 1974 | 1663 | 1353 | 1061 | 789 |
| 25000 | 8000 | | | 3272 | 3318 | 3366 | 3288 | 2926 | 2592 | 2237 | 1871 | 1476 | 1108 | | |
| | 8500 | | | 3037 | 3080 | 3124 | 3051 | 2710 | 2395 | 2060 | 1715 | 1343 | 996 | | |
| | 9000 | | | 2826 | 2866 | 2907 | 2837 | 2515 | 2217 | 1900 | 1574 | 1222 | 894 | | |
| | 9500 | | | 2635 | 2672 | 2711 | 2644 | 2338 | 2056 | 1755 | 1446 | 1112 | 800 | | |
| | 10000 | | | 2461 | 2495 | 2532 | 2468 | 2177 | 1908 | 1622 | 1328 | 1010 | 714 | | |
| | 10500 | | | 2301 | 2334 | 2368 | 2307 | 2029 | 1773 | 1499 | 1219 | 916 | 633 | | |
| 30000 | 8000 | 2649 | 2692 | 2730 | 2669 | 2397 | 2017 | 1661 | 1326 | 986 | 646 | | | | |
| | 8500 | 2447 | 2488 | 2523 | 2465 | 2209 | 1850 | 1515 | 1199 | 878 | 558 | | | | |
| | 9000 | 2266 | 2303 | 2336 | 2281 | 2038 | 1699 | 1382 | 1083 | 780 | 476 | | | | |
| | 9500 | 2101 | 2136 | 2166 | 2114 | 1883 | 1562 | 1261 | 977 | 689 | 401 | | | | |
| | 10000 | 1951 | 1983 | 2011 | 1961 | 1741 | 1435 | 1149 | 879 | 605 | 331 | | | | |
| | 10500 | 1812 | 1843 | 1869 | 1820 | 1611 | 1319 | 1045 | 788 | 526 | 265 | | | | |

2ERROC_UP_2_2_02

All Engine En Route Rate of Climb [FPM]

FLAPS UP, GEAR UP, Ice Protection On, MCT, 210 / 0.57 [KIAS / MACH]

| Alt [ft] | Wt [lb] | TEMPERATURE [°C] -75 | -70 | -65 | -60 | -55 | -50 | -45 | -40 | -35 | -30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35000 | 8000 | 2531 | 2564 | 2595 | 2509 | 2277 | 1965 | 1630 | 1276 | 923 | 545 |
| | 8500 | 2315 | 2345 | 2374 | 2292 | 2072 | 1778 | 1462 | 1128 | 795 | 438 |
| | 9000 | 2119 | 2146 | 2173 | 2095 | 1886 | 1608 | 1309 | 992 | 677 | 339 |
| | 9500 | 1939 | 1965 | 1989 | 1914 | 1716 | 1452 | 1167 | 867 | 567 | 247 |
| | 10000 | 1775 | 1798 | 1820 | 1749 | 1559 | 1307 | 1036 | 750 | 464 | 159 |
| | 10500 | 1623 | 1644 | 1664 | 1595 | 1414 | 1173 | 914 | 641 | 368 | 77 |
| 40000 | 8000 | 1648 | 1674 | 1658 | 1505 | 1240 | 943 | 639 | 293 | -164 | -576 |
| | 8500 | 1469 | 1493 | 1477 | 1331 | 1081 | 800 | 513 | 187 | -244 | -632 |
| | 9000 | 1306 | 1327 | 1311 | 1172 | 935 | 669 | 397 | 88 | -320 | -688 |
| | 9500 | 1155 | 1174 | 1158 | 1025 | 799 | 546 | 288 | -6 | -394 | -743 |
| | 10000 | 1015 | 1032 | 1015 | 889 | 673 | 432 | 185 | -95 | -464 | -797 |
| | 10500 | 884 | 899 | 883 | 761 | 555 | 324 | 88 | -180 | -532 | -850 |
| 43000 | 8000 | 1129 | 1146 | 1111 | 923 | 658 | 365 | -17 | -347 | -730 | -902 |
| | 8500 | 968 | 982 | 949 | 771 | 521 | 243 | -118 | -430 | -566 | -845 |
| | 9000 | 820 | 832 | 799 | 630 | 392 | 129 | -213 | -508 | -636 | -900 |
| | 9500 | 682 | 692 | 660 | 498 | 272 | 22 | -304 | -585 | -705 | -955 |
| | 10000 | 553 | 561 | 529 | 375 | 159 | -80 | -390 | -658 | -772 | -1010 |
| | 10500 | 431 | 438 | 407 | 258 | 51 | -178 | -474 | -730 | -837 | -1065 |

2ERROC_UP_2_3_02

# APPROACH AND LANDING

**Use of approach and landing information tables:**

1. Determine the airplane gross weight and expected airplane configuration based on icing conditions at the time of landing.
2. Obtain airport information:
   - active runway
   - available runway length
   - runway gradient
   - ambient temperature
     - Determine that the temperature is within the ambient temperature limits found in the limitations section.
   - pressure altitude
   - wind
     - Determine the wind component parallel to active runway from the crosswind component chart on page 24.
3. Check the maximum landing weight permitted by climb requirement for the planned airplane configuration on page 234. If the limitations restrict the landing gross weight, the pilot must burn fuel prior to landing.
4. Using the landing gross weight determined in step 3, determine $V_{REF}$ and the uncorrected landing field length on pages 236 – 251.
5. For runway gradients and wind, the landing field length must be corrected using the correction tables on pages 239 – 253.
6. If the available runway length is less than the required landing field length, the airplane weight must be reduced until this requirement can be met.
7. Approach climb and landing climb gradient tables are provided on pages 242 – 259.

**Use of approach and landing information tables (continued):**

**NOTE** Landing distances include a 15 % factor to account for operational factors including crosswind and landing technique. If required, use the Operational Factors Required for Landing Distance section to remove or increase the factor based on the operational rules required.

**NOTE** Landing data for 10,600 lbs are provided for reference and interpolation only in case an emergency landing is required.

**NOTE** The landing field length provided in the performance section of the flight manual is based on a dry runway. If landing on a wet runway, it is recommended to increase the predicted landing field length by 30 %.

**NOTE** Ice Protection ON assumes both ENG and WING A/I are ON. If only ENG A/I is on, the Ice Protection ON tables must be used.

**NOTE** The landing field length wind and runway slope correction tables are valid for Ice Protection Off and On.

## Maximum Landing Weight – Climb and Brake Energy Limited

For reference, data has been provided for weights over the maximum landing weight.

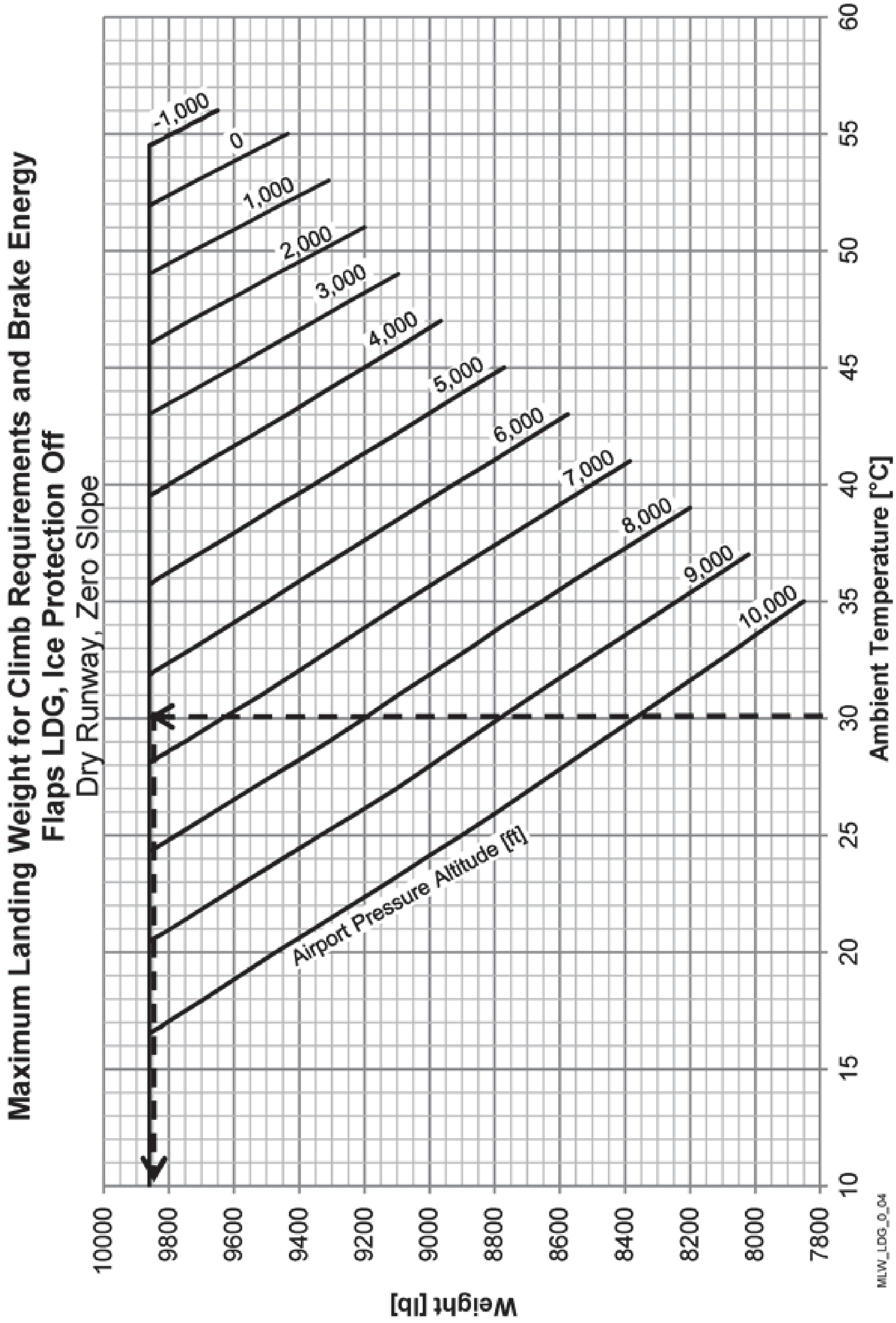
Red shading on landing tables indicates conditions where the airplane does not meet the climb requirements, but can be used for interpolation.

**Example:**

| | |
|---|---|
| Ambient Conditions: | |
| Temperature | 30 °C |
| Airport Altitude | 926 ft |
| Wind | 10 kts Tailwind |
| Runway Gradient | -1.6 % |
| Aircraft Configuration: | |
| Flaps | LDG |
| Weight | 9860 lbs |
| Bleed Setting: | |
| Ice Protection | Off |
| Using the Weight Limit Chart: | |
| Weight Limit | Not Limited |
| Using the Tables: | |
| Uncorrected | |
| • $V_{REF}$ | 112 KIAS |
| • Field Length | 3716 ft |
| • Approach Gradient | 5.7 % |
| Wind Correction: | |
| • Field Length | 4262 ft |
| Slope Correction: | |
| • Field Length: | 6016 ft |

# Honda Aircraft Company





**Uncorrected Landing Field Length [feet]**
**Dry Runway, Zero Slope, No Wind**

**Flaps LDG, Ice Protection Off**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| -1000 | -40 | 2539 | 2602 | 2703 | 2802 | 2900 | 2970 | 3112 |
| | 15 | 2906 | 2981 | 3101 | 3219 | 3335 | 3418 | 3587 |
| | 25 | 2973 | 3051 | 3173 | 3294 | 3414 | 3500 | 3674 |
| | 35 | 3041 | 3120 | 3246 | 3371 | 3494 | 3581 | 3760 |
| | 45 | 3108 | 3190 | 3319 | 3446 | 3573 | 3663 | 3846 |
| | 50 | 3141 | 3224 | 3355 | 3484 | 3612 | 3703 | 3889 |
| | 55 | 3174 | 3258 | 3390 | 3521 | 3651 | 3743 | 3931 |
| Sea Level | -40 | 2596 | 2662 | 2765 | 2867 | 2968 | 3040 | 3186 |
| | 15 | 2976 | 3054 | 3177 | 3298 | 3418 | 3504 | 3678 |
| | 25 | 3046 | 3126 | 3252 | 3377 | 3500 | 3588 | 3767 |
| | 35 | 3116 | 3198 | 3327 | 3455 | 3582 | 3672 | 3856 |
| | 45 | 3185 | 3269 | 3402 | 3534 | 3663 | 3756 | 3945 |
| | 50 | 3219 | 3305 | 3439 | 3572 | 3704 | 3797 | 3989 |
| | 55 | 3253 | 3340 | 3476 | 3611 | 3744 | 3839 | 4032 |
| 1000 | -40 | 2657 | 2724 | 2830 | 2935 | 3039 | 3113 | 3264 |
| | 10 | 3014 | 3093 | 3218 | 3341 | 3462 | 3549 | 3726 |
| | 20 | 3085 | 3167 | 3295 | 3422 | 3547 | 3636 | 3818 |
| | 30 | 3157 | 3241 | 3373 | 3503 | 3631 | 3723 | 3910 |
| | 40 | 3229 | 3315 | 3450 | 3583 | 3715 | 3810 | 4001 |
| | 45 | 3265 | 3352 | 3488 | 3624 | 3757 | 3853 | 4047 |
| | 50 | 3300 | 3388 | 3526 | 3663 | 3799 | 3895 | 4092 |
| 2000 | -40 | 2721 | 2791 | 2900 | 3008 | 3115 | 3191 | 3346 |
| | 10 | 3090 | 3172 | 3300 | 3427 | 3552 | 3642 | 3823 |
| | 20 | 3165 | 3249 | 3381 | 3511 | 3640 | 3731 | 3919 |
| | 30 | 3239 | 3325 | 3461 | 3594 | 3727 | 3821 | 4013 |
| | 40 | 3313 | 3402 | 3540 | 3678 | 3813 | 3910 | 4108 |
| | 45 | 3349 | 3439 | 3580 | 3719 | 3856 | 3955 | 4155 |
| | 50 | 3386 | 3477 | 3619 | 3760 | 3899 | 3998 | 4201 |

LFL_LDG_0_-1_06

| Uncorrected Landing Field Length [feet] Dry Runway, Zero Slope, No Wind — Flaps LDG, Ice Protection Off | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ALT [ft] | TEMP [°C] | Landing Weight [lb] 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| 3000 | -40 | 2788 | 2860 | 2973 | 3084 | 3194 | 3272 | 3432 |
| | 5 | 3132 | 3215 | 3345 | 3473 | 3600 | 3691 | 3876 |
| | 15 | 3208 | 3294 | 3428 | 3560 | 3691 | 3784 | 3974 |
| | 25 | 3285 | 3373 | 3510 | 3646 | 3781 | 3876 | 4072 |
| | 35 | 3362 | 3452 | 3593 | 3732 | 3870 | 3969 | 4170 |
| | 40 | 3399 | 3491 | 3634 | 3775 | 3915 | 4015 | 4218 |
| | 45 | 3437 | 3530 | 3674 | 3817 | 3959 | 4060 | 4266 |
| 4000 | -40 | 2858 | 2933 | 3048 | 3163 | 3276 | 3357 | 3521 |
| | 0 | 3173 | 3258 | 3390 | 3520 | 3649 | 3741 | 3928 |
| | 10 | 3253 | 3340 | 3475 | 3610 | 3742 | 3837 | 4030 |
| | 20 | 3332 | 3422 | 3561 | 3699 | 3835 | 3933 | 4131 |
| | 35 | 3450 | 3543 | 3689 | 3832 | 3974 | 4076 | 4282 |
| | 40 | 3489 | 3584 | 3731 | 3876 | 4020 | 4123 | 4332 |
| | 45 | 3528 | 3623 | 3772 | 3919 | 4065 | 4169 | 4382 |
| 5000 | -40 | 2931 | 3008 | 3127 | 3245 | 3362 | 3445 | 3614 |
| | 0 | 3258 | 3346 | 3481 | 3616 | 3748 | 3843 | 4036 |
| | 10 | 3340 | 3430 | 3570 | 3708 | 3845 | 3942 | 4141 |
| | 30 | 3503 | 3598 | 3746 | 3892 | 4036 | 4140 | 4350 |
| | 35 | 3544 | 3640 | 3790 | 3938 | 4084 | 4189 | 4402 |
| | 40 | 3584 | 3681 | 3833 | 3983 | 4131 | 4237 | 4453 |
| | 45 | 3623 | 3722 | 3876 | 4028 | 4178 | 4285 | 4504 |
| 6000 | -40 | 3007 | 3087 | 3210 | 3332 | 3452 | 3537 | 3712 |
| | -5 | 3303 | 3393 | 3531 | 3667 | 3801 | 3898 | 4094 |
| | 5 | 3388 | 3480 | 3622 | 3762 | 3901 | 4000 | 4202 |
| | 15 | 3473 | 3568 | 3714 | 3858 | 4001 | 4103 | 4311 |
| | 30 | 3599 | 3698 | 3850 | 4000 | 4149 | 4255 | 4472 |
| | 35 | 3640 | 3740 | 3894 | 4047 | 4198 | 4306 | 4525 |
| | 40 | 3682 | 3783 | 3939 | 4093 | 4247 | 4356 | 4578 |

LFL_LDG_0_3_05

Uncorrected Landing Field Length [feet]
Dry Runway, Zero Slope, No Wind

**Flaps LDG, Ice Protection Off**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] 7600 / VREF [KIAS] 100 | 8000 / 102 | 8500 / 105 | 9000 / 108 | 9500 / 111 | 9860 / 113 | 10600 / 117 |
|---|---|---|---|---|---|---|---|---|
| 7000 | -40 | 3087 | 3169 | 3296 | 3421 | 3545 | 3633 | 3813 |
| | -10 | 3349 | 3441 | 3580 | 3719 | 3855 | 3953 | 4152 |
| | 10 | 3525 | 3622 | 3770 | 3917 | 4062 | 4166 | 4377 |
| | 25 | 3656 | 3756 | 3911 | 4064 | 4216 | 4324 | 4544 |
| | 30 | 3699 | 3801 | 3958 | 4113 | 4266 | 4376 | 4600 |
| | 35 | 3742 | 3845 | 4004 | 4161 | 4317 | 4428 | 4655 |
| | 40 | 3784 | 3889 | 4050 | 4209 | 4367 | 4480 | 4709 |
| 8000 | -40 | 3169 | 3254 | 3385 | 3514 | 3642 | 3733 | 3919 |
| | -15 | 3396 | 3489 | 3631 | 3771 | 3910 | 4009 | 4211 |
| | 0 | 3532 | 3630 | 3778 | 3925 | 4071 | 4175 | 4386 |
| | 20 | 3713 | 3816 | 3973 | 4129 | 4283 | 4393 | 4617 |
| | 25 | 3758 | 3862 | 4021 | 4179 | 4336 | 4447 | 4675 |
| | 30 | 3802 | 3908 | 4070 | 4230 | 4388 | 4501 | 4732 |
| | 35 | 3846 | 3953 | 4117 | 4280 | 4440 | 4555 | 4789 |
| 9000 | -40 | 3254 | 3343 | 3478 | 3611 | 3743 | 3837 | 4028 |
| | -15 | 3490 | 3586 | 3733 | 3877 | 4021 | 4123 | 4331 |
| | 15 | 3771 | 3876 | 4036 | 4194 | 4351 | 4463 | 4691 |
| | 20 | 3817 | 3924 | 4086 | 4247 | 4406 | 4519 | 4751 |
| | 25 | 3863 | 3971 | 4136 | 4299 | 4460 | 4576 | 4810 |
| | 30 | 3909 | 4019 | 4186 | 4351 | 4514 | 4631 | 4869 |
| | 35 | 3955 | 4066 | 4235 | 4402 | 4568 | 4687 | 4928 |
| 10000 | -40 | 3343 | 3435 | 3574 | 3711 | 3847 | 3944 | 4142 |
| | -20 | 3539 | 3637 | 3785 | 3932 | 4078 | 4182 | 4393 |
| | 15 | 3878 | 3986 | 4152 | 4315 | 4477 | 4593 | 4828 |
| | 20 | 3925 | 4036 | 4203 | 4369 | 4533 | 4651 | 4890 |
| | 25 | 3973 | 4085 | 4255 | 4423 | 4590 | 4709 | 4951 |
| | 30 | 4021 | 4134 | 4306 | 4477 | 4645 | 4766 | 5012 |
| | 35 | 4068 | 4183 | 4357 | 4530 | 4701 | 4823 | 5073 |

LFL_LDG_0_7_05

| Wind Corrected Landing Field Length [feet] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Flaps LDG, Ice Protection Off | | | | | | | | | |
| Tailwind | | | Headwind | | | | | | |
| -10 | -5 | ◄ REF [0] ► | 5 | 10 | 15 | 20 | 25 | 30 |
| 2450 | 2230 | 2000 | 1950 | 1900 | 1840 | 1790 | 1730 | 1670 |
| 2556 | 2333 | 2100 | 2050 | 1998 | 1938 | 1886 | 1826 | 1766 |
| 2661 | 2436 | 2200 | 2149 | 2097 | 2035 | 1983 | 1922 | 1861 |
| 2767 | 2538 | 2300 | 2249 | 2195 | 2133 | 2079 | 2018 | 1957 |
| 2872 | 2641 | 2400 | 2348 | 2294 | 2230 | 2176 | 2114 | 2052 |
| 2978 | 2744 | 2500 | 2448 | 2392 | 2328 | 2272 | 2210 | 2148 |
| 3084 | 2847 | 2600 | 2548 | 2490 | 2426 | 2368 | 2306 | 2244 |
| 3189 | 2950 | 2700 | 2647 | 2589 | 2523 | 2465 | 2402 | 2339 |
| 3295 | 3052 | 2800 | 2747 | 2687 | 2621 | 2561 | 2498 | 2435 |
| 3400 | 3155 | 2900 | 2846 | 2786 | 2718 | 2658 | 2594 | 2530 |
| 3506 | 3258 | 3000 | 2946 | 2884 | 2816 | 2754 | 2690 | 2626 |
| 3612 | 3361 | 3100 | 3046 | 2982 | 2914 | 2850 | 2786 | 2722 |
| 3717 | 3464 | 3200 | 3145 | 3081 | 3011 | 2947 | 2882 | 2817 |
| 3823 | 3566 | 3300 | 3245 | 3179 | 3109 | 3043 | 2978 | 2913 |
| 3928 | 3669 | 3400 | 3344 | 3278 | 3206 | 3140 | 3074 | 3008 |
| 4034 | 3772 | 3500 | 3444 | 3376 | 3304 | 3236 | 3170 | 3104 |
| 4140 | 3875 | 3600 | 3544 | 3474 | 3402 | 3332 | 3266 | 3200 |
| 4245 | 3978 | 3700 | 3643 | 3573 | 3499 | 3429 | 3362 | 3295 |
| 4351 | 4080 | 3800 | 3743 | 3671 | 3597 | 3525 | 3458 | 3391 |
| 4456 | 4183 | 3900 | 3842 | 3770 | 3694 | 3622 | 3554 | 3486 |
| 4562 | 4286 | 4000 | 3942 | 3868 | 3792 | 3718 | 3650 | 3582 |
| 4668 | 4389 | 4100 | 4042 | 3966 | 3890 | 3814 | 3746 | 3678 |
| 4773 | 4492 | 4200 | 4141 | 4065 | 3987 | 3911 | 3842 | 3773 |
| 4879 | 4594 | 4300 | 4241 | 4163 | 4085 | 4007 | 3938 | 3869 |
| 4984 | 4697 | 4400 | 4340 | 4262 | 4182 | 4104 | 4034 | 3964 |
| 5090 | 4800 | 4500 | 4440 | 4360 | 4280 | 4200 | 4130 | 4060 |
| 5196 | 4903 | 4600 | 4540 | 4458 | 4378 | 4296 | 4226 | 4156 |
| 5301 | 5006 | 4700 | 4639 | 4557 | 4475 | 4393 | 4322 | 4251 |
| 5407 | 5108 | 4800 | 4739 | 4655 | 4573 | 4489 | 4418 | 4347 |
| 5512 | 5211 | 4900 | 4838 | 4754 | 4670 | 4586 | 4514 | 4442 |
| 5618 | 5314 | 5000 | 4938 | 4852 | 4768 | 4682 | 4610 | 4538 |

LWC_LDG_0_06

| Slope Corrected Landing Field Length [feet] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flaps LDG, Ice Protection Off | | | | | | | | |
| Runway Gradient [%] | | | | | | | | |
| -2.0 | -1.5 | -1.0 | -0.5 | ◄ REF [0] ► | 0.5 | 1.0 | 1.5 | 2.0 |
| 2010 | 1957 | 1834 | 1726 | 1600 | 1526 | 1432 | 1379 | 1300 |
| 2197 | 2100 | 1955 | 1835 | 1700 | 1619 | 1521 | 1464 | 1383 |
| 2385 | 2244 | 2077 | 1943 | 1800 | 1713 | 1611 | 1550 | 1465 |
| 2572 | 2387 | 2198 | 2052 | 1900 | 1806 | 1700 | 1635 | 1548 |
| 2760 | 2530 | 2320 | 2160 | 2000 | 1900 | 1790 | 1720 | 1630 |
| 2948 | 2673 | 2442 | 2268 | 2100 | 1994 | 1880 | 1805 | 1712 |
| 3135 | 2816 | 2563 | 2377 | 2200 | 2087 | 1969 | 1890 | 1795 |
| 3323 | 2960 | 2685 | 2485 | 2300 | 2181 | 2059 | 1976 | 1877 |
| 3510 | 3103 | 2806 | 2594 | 2400 | 2274 | 2148 | 2061 | 1960 |
| 3698 | 3246 | 2928 | 2702 | 2500 | 2368 | 2238 | 2146 | 2042 |
| 3886 | 3389 | 3050 | 2810 | 2600 | 2462 | 2328 | 2231 | 2124 |
| 4073 | 3532 | 3171 | 2919 | 2700 | 2555 | 2417 | 2316 | 2207 |
| 4261 | 3676 | 3293 | 3027 | 2800 | 2649 | 2507 | 2402 | 2289 |
| 4448 | 3819 | 3414 | 3136 | 2900 | 2742 | 2596 | 2487 | 2372 |
| 4636 | 3962 | 3536 | 3244 | 3000 | 2836 | 2686 | 2572 | 2454 |
| 4824 | 4105 | 3658 | 3352 | 3100 | 2930 | 2776 | 2657 | 2536 |
| 5011 | 4248 | 3779 | 3461 | 3200 | 3023 | 2865 | 2742 | 2619 |
| 5199 | 4392 | 3901 | 3569 | 3300 | 3117 | 2955 | 2828 | 2701 |
| 5386 | 4535 | 4022 | 3678 | 3400 | 3210 | 3044 | 2913 | 2784 |
| 5574 | 4678 | 4144 | 3786 | 3500 | 3304 | 3134 | 2998 | 2866 |
| 5762 | 4821 | 4266 | 3894 | 3600 | 3398 | 3224 | 3083 | 2948 |
| 5949 | 4964 | 4387 | 4003 | 3700 | 3491 | 3313 | 3168 | 3031 |
| 6137 | 5108 | 4509 | 4111 | 3800 | 3585 | 3403 | 3254 | 3113 |
| 6324 | 5251 | 4630 | 4220 | 3900 | 3678 | 3492 | 3339 | 3196 |
| 6512 | 5394 | 4752 | 4328 | 4000 | 3772 | 3582 | 3424 | 3278 |
| 6700 | 5537 | 4874 | 4436 | 4100 | 3866 | 3672 | 3509 | 3360 |
| 6887 | 5680 | 4995 | 4545 | 4200 | 3959 | 3761 | 3594 | 3443 |
| 7075 | 5824 | 5117 | 4653 | 4300 | 4053 | 3851 | 3680 | 3525 |
| 7262 | 5967 | 5238 | 4762 | 4400 | 4146 | 3940 | 3765 | 3608 |
| 7450 | 6110 | 5360 | 4870 | 4500 | 4240 | 4030 | 3850 | 3690 |
| 7638 | 6253 | 5482 | 4978 | 4600 | 4334 | 4120 | 3935 | 3772 |

LSC1_LDG_0_06

| Slope Corrected Landing Field Length [feet] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flaps LDG, Ice Protection Off | | | | | | | | |
| Runway Gradient [%] | | | | | | | | |
| -2.0 | -1.5 | -1.0 | -0.5 | ◄ REF [0] ► | 0.5 | 1.0 | 1.5 | 2.0 |
| 7638 | 6253 | 5482 | 4978 | 4600 | 4334 | 4120 | 3935 | 3772 |
| 7825 | 6396 | 5603 | 5087 | 4700 | 4427 | 4209 | 4020 | 3855 |
| 8013 | 6540 | 5725 | 5195 | 4800 | 4521 | 4299 | 4106 | 3937 |
| 8200 | 6683 | 5846 | 5304 | 4900 | 4614 | 4388 | 4191 | 4020 |
| 8388 | 6826 | 5968 | 5412 | 5000 | 4708 | 4478 | 4276 | 4102 |
| 8576 | 6969 | 6090 | 5520 | 5100 | 4802 | 4568 | 4361 | 4184 |
| 8763 | 7112 | 6211 | 5629 | 5200 | 4895 | 4657 | 4446 | 4267 |
| 8951 | 7256 | 6333 | 5737 | 5300 | 4989 | 4747 | 4532 | 4349 |
| 9138 | 7399 | 6454 | 5846 | 5400 | 5082 | 4836 | 4617 | 4432 |
| 9326 | 7542 | 6576 | 5954 | 5500 | 5176 | 4926 | 4702 | 4514 |
| 9514 | 7685 | 6698 | 6062 | 5600 | 5270 | 5016 | 4787 | 4596 |
| 9701 | 7828 | 6819 | 6171 | 5700 | 5363 | 5105 | 4872 | 4679 |

LSC2_LDG_0_06

| Uncorrected Discontinued Approach Gradient [%] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| -1000 | -40 | 12.6 | 11.4 | 10.1 | 8.9 | 7.9 | 7.2 | 5.9 |
| | 15 | 12.9 | 11.7 | 10.3 | 9.1 | 8.1 | 7.4 | 6.1 |
| | 25 | 12.9 | 11.7 | 10.4 | 9.2 | 8.1 | 7.4 | 6.1 |
| | 35 | 10.9 | 9.8 | 8.6 | 7.5 | 6.5 | 5.9 | 4.7 |
| | 45 | 8.4 | 7.4 | 6.3 | 5.3 | 4.5 | 3.9 | 2.9 |
| | 50 | 7.1 | 6.2 | 5.2 | 4.3 | 3.5 | 2.9 | 2.0 |
| | 55 | 5.9 | 5.0 | 4.1 | 3.2 | 2.5 | 2.0 | 1.1 |
| Sea Level | -40 | 12.3 | 11.2 | 9.9 | 8.7 | 7.7 | 7.0 | 5.7 |
| | 15 | 12.6 | 11.5 | 10.1 | 9.0 | 7.9 | 7.2 | 5.9 |
| | 25 | 12.7 | 11.5 | 10.2 | 9.0 | 8.0 | 7.3 | 6.0 |
| | 35 | 10.2 | 9.2 | 8.0 | 6.9 | 6.0 | 5.4 | 4.2 |
| | 45 | 7.7 | 6.8 | 5.7 | 4.8 | 4.0 | 3.4 | 2.4 |
| | 50 | 6.4 | 5.6 | 4.6 | 3.7 | 3.0 | 2.5 | 1.5 |
| | 55 | 5.2 | 4.4 | 3.5 | 2.7 | 2.0 | 1.5 | 0.7 |
| 1000 | -40 | 11.9 | 10.8 | 9.5 | 8.3 | 7.3 | 6.7 | 5.4 |
| | 10 | 12.2 | 11.1 | 9.8 | 8.6 | 7.6 | 6.9 | 5.6 |
| | 20 | 12.3 | 11.1 | 9.8 | 8.6 | 7.6 | 6.9 | 5.7 |
| | 30 | 10.6 | 9.5 | 8.3 | 7.2 | 6.3 | 5.6 | 4.5 |
| | 40 | 8.2 | 7.2 | 6.1 | 5.2 | 4.3 | 3.8 | 2.8 |
| | 45 | 6.9 | 6.0 | 5.0 | 4.2 | 3.4 | 2.8 | 1.9 |
| | 50 | 5.7 | 4.9 | 4.0 | 3.1 | 2.4 | 1.9 | 1.0 |
| 2000 | -40 | 11.5 | 10.4 | 9.1 | 8.0 | 7.0 | 6.4 | 5.2 |
| | 10 | 11.8 | 10.7 | 9.4 | 8.3 | 7.3 | 6.6 | 5.4 |
| | 20 | 11.9 | 10.7 | 9.4 | 8.3 | 7.3 | 6.6 | 5.4 |
| | 30 | 9.7 | 8.7 | 7.5 | 6.5 | 5.6 | 5.0 | 3.9 |
| | 40 | 7.4 | 6.5 | 5.5 | 4.5 | 3.7 | 3.2 | 2.2 |
| | 45 | 6.2 | 5.4 | 4.4 | 3.6 | 2.8 | 2.3 | 1.4 |
| | 50 | 5.1 | 4.3 | 3.4 | 2.6 | 1.9 | 1.4 | 0.6 |

MAC_TO_0_-1_07

**Uncorrected Discontinued Approach Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR, Ice Protection Off**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] 7600 / VREF [KIAS] 100 | 8000 / 102 | 8500 / 105 | 9000 / 108 | 9500 / 111 | 9860 / 113 | 10600 / 117 |
|---|---|---|---|---|---|---|---|---|
| 3000 | -40 | 11.1 | 10.0 | 8.8 | 7.7 | 6.7 | 6.0 | 4.9 |
| | 5 | 11.4 | 10.3 | 9.0 | 7.9 | 6.9 | 6.3 | 5.1 |
| | 15 | 11.4 | 10.3 | 9.0 | 7.9 | 6.9 | 6.3 | 5.1 |
| | 25 | 10.0 | 8.9 | 7.8 | 6.7 | 5.8 | 5.2 | 4.1 |
| | 35 | 7.7 | 6.8 | 5.7 | 4.8 | 4.0 | 3.4 | 2.5 |
| | 40 | 6.6 | 5.8 | 4.8 | 3.9 | 3.1 | 2.6 | 1.7 |
| | 45 | 5.5 | 4.7 | 3.8 | 3.0 | 2.2 | 1.8 | 0.9 |
| 4000 | -40 | 10.7 | 9.6 | 8.4 | 7.3 | 6.4 | 5.7 | 4.6 |
| | 0 | 10.9 | 9.8 | 8.6 | 7.5 | 6.6 | 5.9 | 4.8 |
| | 10 | 11.0 | 9.9 | 8.6 | 7.6 | 6.6 | 5.9 | 4.8 |
| | 20 | 10.3 | 9.2 | 8.0 | 7.0 | 6.0 | 5.4 | 4.3 |
| | 35 | 6.9 | 6.0 | 5.0 | 4.1 | 3.3 | 2.8 | 1.9 |
| | 40 | 5.8 | 5.0 | 4.1 | 3.2 | 2.5 | 2.0 | 1.1 |
| | 45 | 4.8 | 4.0 | 3.2 | 2.4 | 1.7 | 1.2 | 0.4 |
| 5000 | -40 | 10.3 | 9.2 | 8.0 | 7.0 | 6.1 | 5.4 | 4.3 |
| | 0 | 10.5 | 9.4 | 8.2 | 7.2 | 6.2 | 5.6 | 4.5 |
| | 10 | 10.5 | 9.4 | 8.2 | 7.2 | 6.2 | 5.6 | 4.5 |
| | 30 | 7.1 | 6.2 | 5.2 | 4.3 | 3.5 | 3.0 | 2.0 |
| | 35 | 6.1 | 5.2 | 4.3 | 3.5 | 2.7 | 2.2 | 1.3 |
| | 40 | 5.1 | 4.3 | 3.4 | 2.6 | 1.9 | 1.4 | 0.6 |
| | 45 | 4.1 | 3.3 | 2.5 | 1.8 | 1.1 | 0.7 | -0.1 |
| 6000 | -40 | 9.9 | 8.9 | 7.7 | 6.7 | 5.8 | 5.2 | 4.0 |
| | -5 | 10.1 | 9.0 | 7.9 | 6.8 | 5.9 | 5.3 | 4.2 |
| | 5 | 10.0 | 9.0 | 7.8 | 6.8 | 5.9 | 5.3 | 4.2 |
| | 15 | 9.6 | 8.6 | 7.4 | 6.4 | 5.5 | 4.9 | 3.8 |
| | 30 | 6.3 | 5.5 | 4.5 | 3.7 | 2.9 | 2.4 | 1.5 |
| | 35 | 5.3 | 4.5 | 3.6 | 2.8 | 2.1 | 1.6 | 0.8 |
| | 40 | 4.3 | 3.6 | 2.7 | 2.0 | 1.3 | 0.9 | 0.1 |

MAC_TO_0_3_05

| Uncorrected Discontinued Approach Gradient [%]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR, Ice Protection Off** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| 7000 | -40 | 9.6 | 8.5 | 7.4 | 6.4 | 5.5 | 4.9 | 3.8 |
| | -10 | 9.7 | 8.7 | 7.5 | 6.5 | 5.6 | 5.0 | 3.9 |
| | 10 | 9.6 | 8.6 | 7.4 | 6.4 | 5.5 | 4.9 | 3.8 |
| | 25 | 6.6 | 5.7 | 4.7 | 3.9 | 3.1 | 2.6 | 1.7 |
| | 30 | 5.6 | 4.7 | 3.8 | 3.0 | 2.3 | 1.8 | 0.9 |
| | 35 | 4.6 | 3.8 | 3.0 | 2.2 | 1.5 | 1.1 | 0.3 |
| | 40 | 3.6 | 2.9 | 2.1 | 1.4 | 0.8 | 0.3 | -0.4 |
| 8000 | -40 | 9.2 | 8.2 | 7.1 | 6.1 | 5.2 | 4.6 | 3.6 |
| | -15 | 9.3 | 8.3 | 7.1 | 6.1 | 5.3 | 4.7 | 3.6 |
| | 0 | 9.2 | 8.2 | 7.1 | 6.1 | 5.2 | 4.6 | 3.5 |
| | 20 | 6.8 | 5.9 | 4.9 | 4.1 | 3.3 | 2.8 | 1.8 |
| | 25 | 5.8 | 5.0 | 4.0 | 3.2 | 2.5 | 2.0 | 1.1 |
| | 30 | 4.8 | 4.0 | 3.2 | 2.4 | 1.7 | 1.3 | 0.4 |
| | 35 | 3.9 | 3.2 | 2.3 | 1.6 | 1.0 | 0.5 | -0.2 |
| 9000 | -40 | 8.9 | 7.9 | 6.8 | 5.8 | 4.9 | 4.4 | 3.3 |
| | -15 | 8.8 | 7.9 | 6.8 | 5.8 | 4.9 | 4.3 | 3.3 |
| | 15 | 7.0 | 6.1 | 5.1 | 4.2 | 3.4 | 2.9 | 2.0 |
| | 20 | 6.0 | 5.2 | 4.2 | 3.4 | 2.7 | 2.2 | 1.3 |
| | 25 | 5.0 | 4.2 | 3.4 | 2.6 | 1.9 | 1.4 | 0.6 |
| | 30 | 4.1 | 3.4 | 2.5 | 1.8 | 1.1 | 0.7 | -0.1 |
| | 35 | 3.2 | 2.5 | 1.7 | 1.0 | 0.4 | 0.0 | -0.7 |
| 10000 | -40 | 8.5 | 7.5 | 6.4 | 5.5 | 4.6 | 4.1 | 3.0 |
| | -20 | 8.4 | 7.5 | 6.4 | 5.4 | 4.6 | 4.0 | 3.0 |
| | 15 | 6.2 | 5.4 | 4.4 | 3.6 | 2.8 | 2.3 | 1.4 |
| | 20 | 5.3 | 4.5 | 3.6 | 2.8 | 2.1 | 1.6 | 0.7 |
| | 25 | 4.3 | 3.5 | 2.7 | 2.0 | 1.3 | 0.9 | 0.1 |
| | 30 | 3.4 | 2.7 | 1.9 | 1.2 | 0.6 | 0.2 | -0.6 |
| | 35 | 2.5 | 1.9 | 1.1 | 0.5 | -0.1 | -0.5 | -1.2 |

MAC_TO_0_7_06

**Uncorrected Balked Landing Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps LDG, Ice Protection Off**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
|---|---|---|---|---|---|---|---|---|
| | | VREF [KIAS] 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| -1000 | -40 | 32.2 | 29.8 | 27.1 | 24.8 | 22.6 | 21.2 | 18.7 |
| | 15 | 32.6 | 30.3 | 27.6 | 25.2 | 23.0 | 21.6 | 19.0 |
| | 25 | 32.8 | 30.4 | 27.7 | 25.3 | 23.1 | 21.7 | 19.1 |
| | 35 | 28.7 | 26.6 | 24.1 | 21.9 | 19.9 | 18.6 | 16.3 |
| | 45 | 23.6 | 21.7 | 19.5 | 17.6 | 15.8 | 14.7 | 12.6 |
| | 50 | 21.0 | 19.3 | 17.2 | 15.4 | 13.8 | 12.7 | 10.8 |
| | 55 | 18.6 | 16.9 | 15.0 | 13.3 | 11.8 | 10.8 | 9.0 |
| Sea Level | -40 | 32.0 | 29.7 | 27.0 | 24.6 | 22.5 | 21.1 | 18.6 |
| | 15 | 32.5 | 30.1 | 27.4 | 25.0 | 22.9 | 21.5 | 18.9 |
| | 25 | 32.6 | 30.2 | 27.5 | 25.1 | 23.0 | 21.6 | 19.0 |
| | 35 | 27.6 | 25.5 | 23.1 | 20.9 | 19.0 | 17.8 | 15.4 |
| | 45 | 22.4 | 20.6 | 18.5 | 16.6 | 14.9 | 13.8 | 11.7 |
| | 50 | 19.9 | 18.2 | 16.2 | 14.4 | 12.9 | 11.8 | 9.9 |
| | 55 | 17.4 | 15.9 | 14.0 | 12.4 | 10.9 | 10.0 | 8.2 |
| 1000 | -40 | 31.1 | 28.8 | 26.2 | 23.9 | 21.8 | 20.4 | 17.9 |
| | 10 | 31.6 | 29.3 | 26.6 | 24.3 | 22.2 | 20.8 | 18.3 |
| | 20 | 31.7 | 29.4 | 26.7 | 24.4 | 22.3 | 20.9 | 18.4 |
| | 30 | 28.3 | 26.2 | 23.7 | 21.5 | 19.6 | 18.3 | 16.0 |
| | 40 | 23.4 | 21.5 | 19.3 | 17.4 | 15.6 | 14.5 | 12.4 |
| | 45 | 20.9 | 19.1 | 17.1 | 15.3 | 13.7 | 12.6 | 10.7 |
| | 50 | 18.4 | 16.8 | 14.9 | 13.2 | 11.7 | 10.7 | 8.9 |
| 2000 | -40 | 30.2 | 28.0 | 25.4 | 23.2 | 21.1 | 19.8 | 17.4 |
| | 10 | 30.8 | 28.5 | 25.9 | 23.6 | 21.6 | 20.2 | 17.7 |
| | 20 | 30.9 | 28.6 | 26.0 | 23.7 | 21.6 | 20.3 | 17.8 |
| | 30 | 26.5 | 24.5 | 22.1 | 20.0 | 18.2 | 17.0 | 14.7 |
| | 40 | 21.8 | 20.0 | 17.9 | 16.1 | 14.4 | 13.3 | 11.3 |
| | 45 | 19.4 | 17.8 | 15.8 | 14.1 | 12.5 | 11.5 | 9.6 |
| | 50 | 17.1 | 15.5 | 13.7 | 12.1 | 10.6 | 9.7 | 8.0 |

BLC_LDG_0_-1_06

| Uncorrected Balked Landing Gradient [%] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps LDG, Ice Protection Off** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| 3000 | -40 | 29.4 | 27.2 | 24.7 | 22.5 | 20.5 | 19.2 | 16.8 |
| | 5 | 29.9 | 27.7 | 25.2 | 22.9 | 20.9 | 19.6 | 17.2 |
| | 15 | 30.0 | 27.8 | 25.2 | 23.0 | 21.0 | 19.6 | 17.2 |
| | 25 | 27.1 | 25.0 | 22.6 | 20.5 | 18.7 | 17.4 | 15.1 |
| | 35 | 22.5 | 20.6 | 18.5 | 16.7 | 15.0 | 13.9 | 11.9 |
| | 40 | 20.3 | 18.6 | 16.6 | 14.8 | 13.2 | 12.2 | 10.3 |
| | 45 | 18.0 | 16.4 | 14.6 | 12.9 | 11.4 | 10.4 | 8.7 |
| 4000 | -40 | 28.6 | 26.5 | 24.0 | 21.8 | 19.8 | 18.6 | 16.2 |
| | 0 | 29.0 | 26.9 | 24.4 | 22.2 | 20.2 | 18.9 | 16.5 |
| | 10 | 29.1 | 26.9 | 24.4 | 22.2 | 20.2 | 18.9 | 16.6 |
| | 20 | 27.7 | 25.6 | 23.2 | 21.0 | 19.1 | 17.9 | 15.6 |
| | 35 | 20.8 | 19.1 | 17.1 | 15.3 | 13.7 | 12.6 | 10.7 |
| | 40 | 18.7 | 17.1 | 15.2 | 13.5 | 12.0 | 11.0 | 9.2 |
| | 45 | 16.7 | 15.1 | 13.3 | 11.8 | 10.3 | 9.4 | 7.7 |
| 5000 | -40 | 27.8 | 25.7 | 23.3 | 21.1 | 19.2 | 17.9 | 15.6 |
| | 0 | 28.2 | 26.1 | 23.6 | 21.4 | 19.5 | 18.2 | 15.9 |
| | 10 | 28.2 | 26.1 | 23.6 | 21.4 | 19.5 | 18.2 | 15.9 |
| | 30 | 21.3 | 19.5 | 17.5 | 15.7 | 14.0 | 13.0 | 11.0 |
| | 35 | 19.2 | 17.6 | 15.6 | 13.9 | 12.4 | 11.4 | 9.6 |
| | 40 | 17.2 | 15.6 | 13.8 | 12.2 | 10.8 | 9.8 | 8.1 |
| | 45 | 15.2 | 13.7 | 12.0 | 10.5 | 9.2 | 8.3 | 6.7 |
| 6000 | -40 | 27.0 | 24.9 | 22.6 | 20.5 | 18.6 | 17.3 | 15.1 |
| | -5 | 27.3 | 25.2 | 22.9 | 20.7 | 18.8 | 17.6 | 15.3 |
| | 5 | 27.2 | 25.2 | 22.8 | 20.7 | 18.8 | 17.6 | 15.3 |
| | 15 | 26.3 | 24.3 | 22.0 | 19.9 | 18.0 | 16.8 | 14.6 |
| | 30 | 19.7 | 18.0 | 16.1 | 14.3 | 12.8 | 11.7 | 9.9 |
| | 35 | 17.7 | 16.1 | 14.2 | 12.6 | 11.2 | 10.2 | 8.4 |
| | 40 | 15.7 | 14.2 | 12.5 | 10.9 | 9.6 | 8.7 | 7.1 |

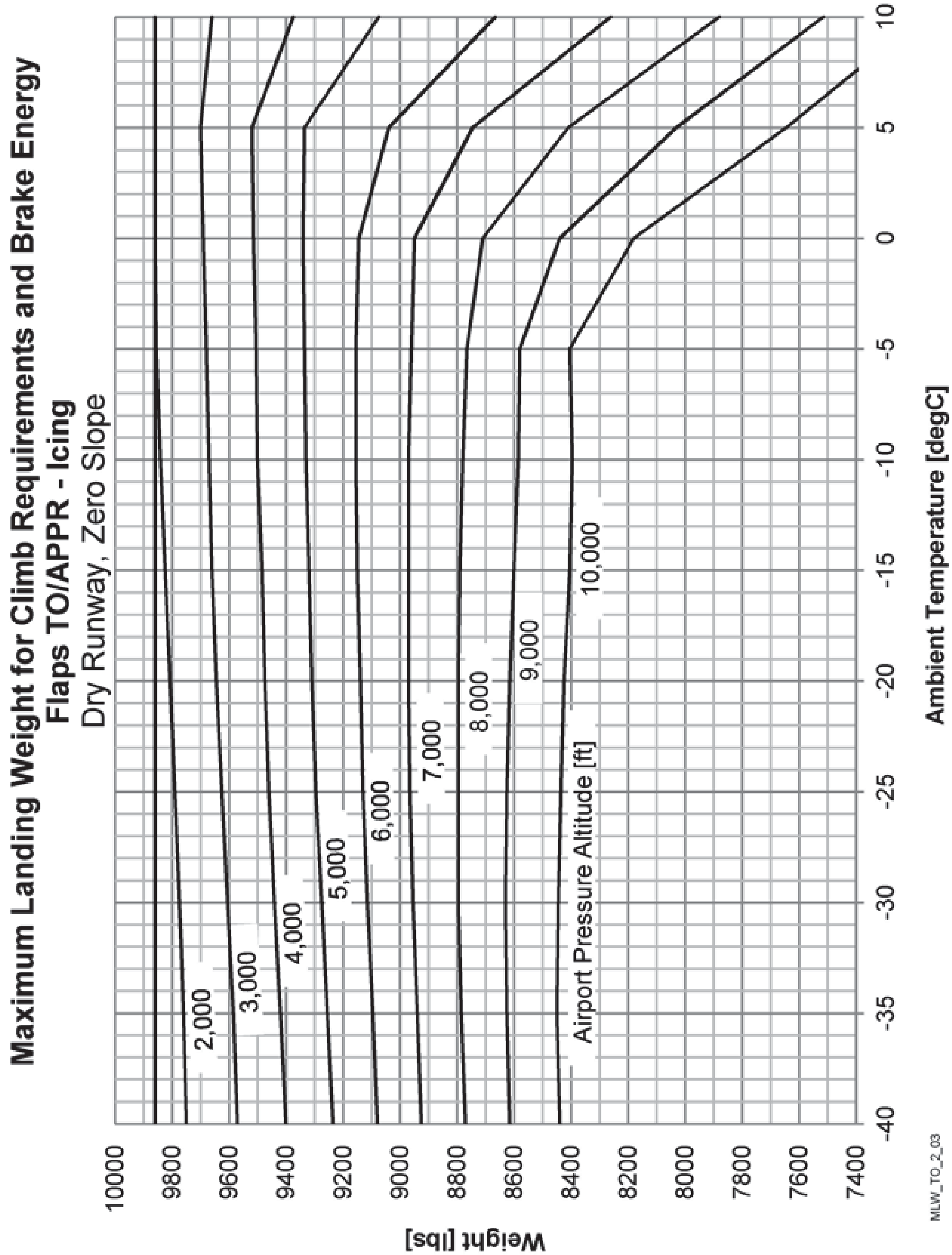
BLC_LDG_0_3_05

**Uncorrected Balked Landing Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps LDG, Ice Protection Off**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 100 | 102 | 105 | 108 | 111 | 113 | 117 |
| 7000 | -40 | 26.3 | 24.2 | 21.9 | 19.8 | 18.0 | 16.8 | 14.6 |
| | -10 | 26.5 | 24.4 | 22.1 | 20.0 | 18.2 | 17.0 | 14.7 |
| | 10 | 26.3 | 24.3 | 21.9 | 19.9 | 18.0 | 16.8 | 14.6 |
| | 25 | 20.2 | 18.5 | 16.5 | 14.7 | 13.2 | 12.1 | 10.2 |
| | 30 | 18.1 | 16.5 | 14.7 | 13.0 | 11.5 | 10.6 | 8.8 |
| | 35 | 16.2 | 14.7 | 12.9 | 11.4 | 10.0 | 9.1 | 7.4 |
| | 40 | 14.2 | 12.8 | 11.2 | 9.7 | 8.4 | 7.6 | 6.0 |
| 8000 | -40 | 25.5 | 23.5 | 21.3 | 19.2 | 17.4 | 16.2 | 14.1 |
| | -15 | 25.7 | 23.7 | 21.4 | 19.3 | 17.5 | 16.3 | 14.2 |
| | 0 | 25.5 | 23.5 | 21.2 | 19.2 | 17.4 | 16.2 | 14.0 |
| | 20 | 20.7 | 19.0 | 17.0 | 15.2 | 13.6 | 12.5 | 10.6 |
| | 25 | 18.6 | 17.0 | 15.1 | 13.4 | 11.9 | 10.9 | 9.1 |
| | 30 | 16.6 | 15.1 | 13.3 | 11.7 | 10.3 | 9.4 | 7.7 |
| | 35 | 14.8 | 13.3 | 11.7 | 10.2 | 8.9 | 8.0 | 6.4 |
| 9000 | -40 | 24.8 | 22.9 | 20.6 | 18.6 | 16.9 | 15.7 | 13.6 |
| | -15 | 24.8 | 22.9 | 20.6 | 18.6 | 16.9 | 15.7 | 13.6 |
| | 15 | 21.1 | 19.3 | 17.3 | 15.5 | 13.9 | 12.8 | 10.9 |
| | 20 | 19.1 | 17.4 | 15.5 | 13.8 | 12.3 | 11.3 | 9.5 |
| | 25 | 17.1 | 15.5 | 13.7 | 12.1 | 10.7 | 9.8 | 8.0 |
| | 30 | 15.2 | 13.7 | 12.0 | 10.5 | 9.2 | 8.3 | 6.7 |
| | 35 | 13.3 | 12.0 | 10.4 | 9.0 | 7.7 | 6.9 | 5.4 |
| 10000 | -40 | 24.1 | 22.1 | 20.0 | 18.0 | 16.3 | 15.1 | 13.0 |
| | -20 | 24.0 | 22.1 | 19.9 | 17.9 | 16.2 | 15.1 | 13.0 |
| | 15 | 19.5 | 17.8 | 15.9 | 14.1 | 12.6 | 11.6 | 9.7 |
| | 20 | 17.5 | 16.0 | 14.1 | 12.5 | 11.1 | 10.1 | 8.4 |
| | 25 | 15.6 | 14.1 | 12.4 | 10.9 | 9.5 | 8.6 | 7.0 |
| | 30 | 13.8 | 12.4 | 10.8 | 9.3 | 8.1 | 7.2 | 5.7 |
| | 35 | 12.0 | 10.7 | 9.2 | 7.8 | 6.6 | 5.9 | 4.4 |

BLC_LDG_0_7_05


Maximum Landing Weight for Climb Requirements and Brake Energy
Flaps TO/APPR - Icing
Dry Runway, Zero Slope
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Airport Pressure Altitude [ft]
Ambient Temperature [degC]
Weight [lbs]
10000
9800
9600
9400
9200
9000
8800
8600
8400
8200
8000
7800
7600
7400
-40
-35
-30
-25
-20
-15
-10
-5
0
5
10
MLW_TO_2_03

| Uncorrected Landing Field Length [feet] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR - Icing** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | **7600** | **8000** | **8500** | **9000** | **9500** | **9860** | **10600** |
| | | VREF [KIAS] | | | | | | |
| | | **109** | **111** | **115** | **118** | **121** | **124** | **128** |
| -1000 | -40 | 2818 | 2909 | 3021 | 3131 | 3241 | 3319 | 3478 |
| | -20 | 2964 | 3062 | 3182 | 3301 | 3419 | 3503 | 3674 |
| | -10 | 3056 | 3156 | 3280 | 3402 | 3523 | 3610 | 3786 |
| | -5 | 3090 | 3192 | 3317 | 3442 | 3565 | 3653 | 3831 |
| | 0 | 3123 | 3227 | 3354 | 3481 | 3606 | 3695 | 3877 |
| | 5 | 3156 | 3261 | 3391 | 3519 | 3646 | 3737 | 3921 |
| | 10 | 3187 | 3294 | 3425 | 3556 | 3684 | 3776 | 3964 |
| Sea Level | -40 | 2878 | 2971 | 3086 | 3200 | 3312 | 3393 | 3557 |
| | -20 | 3030 | 3131 | 3255 | 3377 | 3498 | 3585 | 3761 |
| | -10 | 3128 | 3231 | 3359 | 3484 | 3609 | 3698 | 3879 |
| | -5 | 3163 | 3268 | 3397 | 3525 | 3652 | 3742 | 3927 |
| | 0 | 3198 | 3304 | 3435 | 3565 | 3694 | 3786 | 3973 |
| | 5 | 3231 | 3339 | 3473 | 3605 | 3736 | 3829 | 4019 |
| | 10 | 3262 | 3371 | 3507 | 3641 | 3773 | 3868 | 4061 |
| 1000 | -40 | 2940 | 3036 | 3155 | 3273 | 3389 | 3472 | 3640 |
| | -20 | 3104 | 3207 | 3335 | 3461 | 3585 | 3675 | 3856 |
| | -10 | 3203 | 3309 | 3440 | 3570 | 3698 | 3790 | 3977 |
| | -5 | 3240 | 3347 | 3481 | 3612 | 3743 | 3836 | 4026 |
| | 0 | 3274 | 3383 | 3519 | 3653 | 3785 | 3880 | 4073 |
| | 5 | 3308 | 3419 | 3556 | 3692 | 3827 | 3923 | 4118 |
| | 10 | 3342 | 3455 | 3594 | 3732 | 3869 | 3966 | 4164 |
| 2000 | -40 | 3006 | 3105 | 3228 | 3349 | 3469 | 3554 | 3728 |
| | -20 | 3183 | 3289 | 3420 | 3549 | 3678 | 3769 | 3956 |
| | -10 | 3281 | 3391 | 3526 | 3659 | 3792 | 3886 | 4079 |
| | -5 | 3319 | 3430 | 3567 | 3703 | 3838 | 3934 | 4129 |
| | 0 | 3354 | 3466 | 3606 | 3744 | 3880 | 3978 | 4177 |
| | 5 | 3389 | 3504 | 3645 | 3785 | 3924 | 4023 | 4225 |
| | 10 | 3425 | 3542 | 3685 | 3827 | 3968 | 4068 | 4272 |

LFL_TO_2_-1_03

| Uncorrected Landing Field Length [feet]<br>Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR - Icing** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | **7600** | **8000** | **8500** | **9000** | **9500** | **9860** | **10600** |
| | | VREF [KIAS] | | | | | | |
| | | **109** | **111** | **115** | **118** | **121** | **124** | **128** |
| 3000 | -40 | 3080 | 3182 | 3308 | 3433 | 3556 | 3644 | 3824 |
| | -20 | 3265 | 3374 | 3509 | 3643 | 3775 | 3869 | 4062 |
| | -10 | 3365 | 3477 | 3616 | 3754 | 3890 | 3987 | 4186 |
| | -5 | 3401 | 3516 | 3657 | 3797 | 3935 | 4034 | 4236 |
| | 0 | 3437 | 3553 | 3697 | 3839 | 3980 | 4080 | 4285 |
| | 5 | 3475 | 3593 | 3738 | 3883 | 4026 | 4128 | 4336 |
| | 10 | 3512 | 3632 | 3780 | 3926 | 4071 | 4174 | 4385 |
| 4000 | -40 | 3162 | 3267 | 3397 | 3525 | 3652 | 3743 | 3928 |
| | -20 | 3345 | 3458 | 3597 | 3735 | 3871 | 3968 | 4167 |
| | -10 | 3448 | 3564 | 3707 | 3849 | 3989 | 4090 | 4294 |
| | -5 | 3486 | 3604 | 3750 | 3894 | 4037 | 4139 | 4346 |
| | 0 | 3524 | 3644 | 3792 | 3938 | 4083 | 4187 | 4398 |
| | 5 | 3562 | 3684 | 3834 | 3983 | 4130 | 4235 | 4449 |
| | 10 | 3603 | 3726 | 3878 | 4029 | 4178 | 4284 | 4501 |
| 5000 | -40 | 3246 | 3354 | 3487 | 3619 | 3750 | 3844 | 4034 |
| | -20 | 3431 | 3547 | 3690 | 3832 | 3973 | 4073 | 4277 |
| | -10 | 3536 | 3656 | 3804 | 3950 | 4095 | 4198 | 4409 |
| | -5 | 3574 | 3696 | 3846 | 3995 | 4142 | 4247 | 4461 |
| | 0 | 3614 | 3738 | 3890 | 4041 | 4191 | 4298 | 4516 |
| | 5 | 3655 | 3780 | 3935 | 4089 | 4241 | 4349 | 4570 |
| | 10 | 3696 | 3823 | 3980 | 4135 | 4289 | 4398 | 4622 |
| 6000 | -40 | 3335 | 3446 | 3584 | 3720 | 3855 | 3951 | 4147 |
| | -20 | 3523 | 3643 | 3791 | 3937 | 4082 | 4185 | 4396 |
| | -10 | 3627 | 3750 | 3902 | 4053 | 4202 | 4309 | 4526 |
| | -5 | 3667 | 3792 | 3947 | 4100 | 4252 | 4360 | 4581 |
| | 0 | 3709 | 3836 | 3993 | 4149 | 4303 | 4413 | 4638 |
| | 5 | 3751 | 3880 | 4040 | 4198 | 4355 | 4467 | 4695 |
| | 10 | 3794 | 3925 | 4087 | 4247 | 4406 | 4520 | 4751 |

LFL_TO_2_3_03

**Uncorrected Landing Field Length [feet]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR - Icing**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 109 | 111 | 115 | 118 | 121 | 124 | 128 |
| 7000 | -40 | 3427 | 3541 | 3683 | 3823 | 3962 | 4061 | 4264 |
| | -20 | 3611 | 3734 | 3887 | 4037 | 4187 | 4294 | 4511 |
| | -10 | 3720 | 3847 | 4004 | 4159 | 4313 | 4423 | 4648 |
| | -5 | 3762 | 3891 | 4051 | 4209 | 4365 | 4477 | 4705 |
| | 0 | 3806 | 3937 | 4099 | 4260 | 4418 | 4532 | 4763 |
| | 5 | 3851 | 3984 | 4148 | 4311 | 4473 | 4588 | 4823 |
| | 10 | 3895 | 4029 | 4196 | 4361 | 4525 | 4642 | 4880 |
| 8000 | -40 | 3519 | 3637 | 3783 | 3927 | 4070 | 4173 | 4381 |
| | -20 | 3708 | 3835 | 3992 | 4148 | 4302 | 4412 | 4636 |
| | -10 | 3817 | 3948 | 4110 | 4270 | 4429 | 4542 | 4774 |
| | -5 | 3861 | 3994 | 4158 | 4321 | 4482 | 4597 | 4832 |
| | 0 | 3907 | 4042 | 4208 | 4374 | 4538 | 4655 | 4893 |
| | 5 | 3954 | 4091 | 4260 | 4428 | 4594 | 4713 | 4955 |
| | 10 | 4001 | 4140 | 4312 | 4482 | 4651 | 4771 | 5017 |
| 9000 | -40 | 3611 | 3732 | 3883 | 4032 | 4180 | 4285 | 4500 |
| | -20 | 3805 | 3936 | 4098 | 4259 | 4418 | 4531 | 4763 |
| | -10 | 3917 | 4052 | 4219 | 4384 | 4548 | 4665 | 4903 |
| | -5 | 3964 | 4101 | 4271 | 4439 | 4605 | 4724 | 4966 |
| | 0 | 4012 | 4152 | 4324 | 4494 | 4663 | 4784 | 5030 |
| | 5 | 4061 | 4202 | 4377 | 4550 | 4722 | 4844 | 5094 |
| | 10 | 4113 | 4256 | 4434 | 4609 | 4783 | 4908 | 5161 |
| 10000 | -40 | 3706 | 3831 | 3986 | 4140 | 4293 | 4402 | 4624 |
| | -20 | 3908 | 4043 | 4210 | 4376 | 4540 | 4657 | 4896 |
| | -10 | 4023 | 4162 | 4334 | 4505 | 4674 | 4795 | 5041 |
| | -5 | 4072 | 4213 | 4388 | 4562 | 4734 | 4856 | 5107 |
| | 0 | 4123 | 4266 | 4444 | 4620 | 4795 | 4920 | 5174 |
| | 5 | 4173 | 4319 | 4499 | 4678 | 4855 | 4982 | 5240 |
| | 10 | 4230 | 4378 | 4561 | 4743 | 4922 | 5051 | 5312 |

LFL_TO_2_7_03

| Wind Corrected Landing Field Length [feet] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Flaps TO/APPR - Icing | | | | | | | | | |
| Tailwind | | | Headwind | | | | | | |
| -10 | -5 | ◄ REF [0] ► | 5 | 10 | 15 | 20 | 25 | 30 |
| 2440 | 2220 | 2000 | 1945 | 1890 | 1830 | 1775 | 1720 | 1660 |
| 2546 | 2323 | 2100 | 2044 | 1989 | 1928 | 1872 | 1816 | 1756 |
| 2651 | 2426 | 2200 | 2144 | 2087 | 2026 | 1969 | 1912 | 1851 |
| 2757 | 2529 | 2300 | 2243 | 2186 | 2123 | 2065 | 2008 | 1947 |
| 2862 | 2632 | 2400 | 2342 | 2284 | 2221 | 2162 | 2104 | 2042 |
| 2968 | 2735 | 2500 | 2441 | 2383 | 2319 | 2259 | 2200 | 2138 |
| 3073 | 2838 | 2600 | 2541 | 2481 | 2417 | 2356 | 2296 | 2233 |
| 3179 | 2941 | 2700 | 2640 | 2580 | 2514 | 2452 | 2392 | 2329 |
| 3284 | 3044 | 2800 | 2739 | 2678 | 2612 | 2549 | 2488 | 2424 |
| 3390 | 3147 | 2900 | 2838 | 2777 | 2710 | 2646 | 2584 | 2520 |
| 3495 | 3250 | 3000 | 2938 | 2875 | 2808 | 2743 | 2680 | 2615 |
| 3601 | 3353 | 3100 | 3037 | 2974 | 2905 | 2839 | 2776 | 2711 |
| 3706 | 3456 | 3200 | 3136 | 3072 | 3003 | 2936 | 2872 | 2806 |
| 3812 | 3559 | 3300 | 3235 | 3171 | 3101 | 3033 | 2968 | 2902 |
| 3917 | 3662 | 3400 | 3335 | 3269 | 3199 | 3130 | 3064 | 2997 |
| 4023 | 3765 | 3500 | 3434 | 3368 | 3296 | 3226 | 3160 | 3093 |
| 4128 | 3868 | 3600 | 3533 | 3466 | 3394 | 3323 | 3256 | 3188 |
| 4234 | 3971 | 3700 | 3632 | 3565 | 3492 | 3420 | 3352 | 3284 |
| 4339 | 4074 | 3800 | 3732 | 3663 | 3590 | 3517 | 3448 | 3379 |
| 4445 | 4177 | 3900 | 3831 | 3762 | 3687 | 3613 | 3544 | 3475 |
| 4550 | 4280 | 4000 | 3930 | 3860 | 3785 | 3710 | 3640 | 3570 |
| 4656 | 4383 | 4100 | 4029 | 3959 | 3883 | 3807 | 3736 | 3666 |
| 4761 | 4486 | 4200 | 4129 | 4057 | 3981 | 3904 | 3832 | 3761 |
| 4867 | 4589 | 4300 | 4228 | 4156 | 4078 | 4000 | 3928 | 3857 |
| 4972 | 4692 | 4400 | 4327 | 4254 | 4176 | 4097 | 4024 | 3952 |
| 5078 | 4795 | 4500 | 4426 | 4353 | 4274 | 4194 | 4120 | 4048 |
| 5183 | 4898 | 4600 | 4526 | 4451 | 4372 | 4291 | 4216 | 4143 |
| 5289 | 5001 | 4700 | 4625 | 4550 | 4469 | 4387 | 4312 | 4239 |
| 5394 | 5104 | 4800 | 4724 | 4648 | 4567 | 4484 | 4408 | 4334 |
| 5500 | 5207 | 4900 | 4823 | 4747 | 4665 | 4581 | 4504 | 4430 |
| 5605 | 5310 | 5000 | 4923 | 4845 | 4763 | 4678 | 4600 | 4525 |

LWC_TO_2_02

| Slope Corrected Landing Field Length [feet] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Flaps TO/APPR - Icing | | | | | | | | |
| Runway Gradient [%] | | | | | | | | |
| -2.0 | -1.5 | -1.0 | -0.5 | ◄ REF [0] ► | 0.5 | 1.0 | 1.5 | 2.0 |
| 3134 | 2806 | 2558 | 2361 | 2200 | 2076 | 1966 | 1880 | 1793 |
| 3320 | 2950 | 2680 | 2470 | 2300 | 2170 | 2055 | 1965 | 1875 |
| 3506 | 3094 | 2802 | 2579 | 2400 | 2264 | 2144 | 2050 | 1957 |
| 3692 | 3238 | 2923 | 2688 | 2500 | 2358 | 2233 | 2135 | 2039 |
| 3877 | 3382 | 3045 | 2798 | 2600 | 2452 | 2323 | 2220 | 2121 |
| 4063 | 3525 | 3166 | 2907 | 2700 | 2545 | 2412 | 2305 | 2203 |
| 4249 | 3669 | 3288 | 3016 | 2800 | 2639 | 2501 | 2390 | 2285 |
| 4435 | 3813 | 3409 | 3125 | 2900 | 2733 | 2590 | 2475 | 2367 |
| 4620 | 3957 | 3531 | 3235 | 3000 | 2827 | 2680 | 2560 | 2448 |
| 4806 | 4101 | 3652 | 3344 | 3100 | 2921 | 2769 | 2645 | 2530 |
| 4992 | 4245 | 3774 | 3453 | 3200 | 3015 | 2858 | 2730 | 2612 |
| 5178 | 4388 | 3895 | 3562 | 3300 | 3108 | 2947 | 2815 | 2694 |
| 5363 | 4532 | 4017 | 3672 | 3400 | 3202 | 3037 | 2900 | 2776 |
| 5549 | 4676 | 4138 | 3781 | 3500 | 3296 | 3126 | 2985 | 2858 |
| 5735 | 4820 | 4260 | 3890 | 3600 | 3390 | 3215 | 3070 | 2940 |
| 5921 | 4964 | 4382 | 3999 | 3700 | 3484 | 3304 | 3155 | 3022 |
| 6107 | 5108 | 4503 | 4108 | 3800 | 3578 | 3393 | 3240 | 3104 |
| 6292 | 5252 | 4625 | 4218 | 3900 | 3672 | 3483 | 3325 | 3186 |
| 6478 | 5395 | 4746 | 4327 | 4000 | 3765 | 3572 | 3410 | 3268 |
| 6664 | 5539 | 4868 | 4436 | 4100 | 3859 | 3661 | 3495 | 3350 |
| 6850 | 5683 | 4989 | 4545 | 4200 | 3953 | 3750 | 3580 | 3432 |
| 7035 | 5827 | 5111 | 4655 | 4300 | 4047 | 3840 | 3665 | 3513 |
| 7221 | 5971 | 5232 | 4764 | 4400 | 4141 | 3929 | 3750 | 3595 |
| 7407 | 6115 | 5354 | 4873 | 4500 | 4235 | 4018 | 3835 | 3677 |
| 7593 | 6258 | 5475 | 4982 | 4600 | 4328 | 4107 | 3920 | 3759 |
| 7778 | 6402 | 5597 | 5092 | 4700 | 4422 | 4197 | 4005 | 3841 |
| 7964 | 6546 | 5718 | 5201 | 4800 | 4516 | 4286 | 4090 | 3923 |
| 8150 | 6690 | 5840 | 5310 | 4900 | 4610 | 4375 | 4175 | 4005 |
| 8336 | 6834 | 5962 | 5419 | 5000 | 4704 | 4464 | 4260 | 4087 |
| 8522 | 6978 | 6083 | 5528 | 5100 | 4798 | 4553 | 4345 | 4169 |
| 8707 | 7122 | 6205 | 5638 | 5200 | 4892 | 4643 | 4430 | 4251 |

LSC_TO_2_02

| Uncorrected Discontinued Approach Gradient [%] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR - Icing** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | **7600** | **8000** | **8500** | **9000** | **9500** | **9860** | **10600** |
| | | VREF [KIAS] | | | | | | |
| | | **109** | **111** | **115** | **118** | **121** | **124** | **128** |
| -1000 | -40 | 8.0 | 6.9 | 5.6 | 4.4 | 3.4 | 2.7 | **1.5** |
| | -20 | 8.1 | 6.9 | 5.6 | 4.4 | 3.4 | 2.7 | **1.5** |
| | -10 | 8.1 | 6.9 | 5.6 | 4.5 | 3.4 | 2.8 | **1.5** |
| | -5 | 8.1 | 7.0 | 5.7 | 4.5 | 3.5 | 2.8 | **1.6** |
| | 0 | 8.2 | 7.0 | 5.7 | 4.5 | 3.5 | 2.8 | **1.6** |
| | 5 | 8.2 | 7.1 | 5.7 | 4.6 | 3.5 | 2.9 | **1.6** |
| | 10 | 8.3 | 7.1 | 5.8 | 4.6 | 3.6 | 2.9 | **1.6** |
| Sea Level | -40 | 7.8 | 6.6 | 5.3 | 4.2 | 3.2 | 2.5 | **1.3** |
| | -20 | 7.8 | 6.7 | 5.4 | 4.2 | 3.2 | 2.6 | **1.3** |
| | -10 | 7.9 | 6.7 | 5.4 | 4.3 | 3.3 | 2.6 | **1.4** |
| | -5 | 7.9 | 6.8 | 5.5 | 4.3 | 3.3 | 2.6 | **1.4** |
| | 0 | 8.0 | 6.8 | 5.5 | 4.4 | 3.4 | 2.7 | **1.5** |
| | 5 | 8.0 | 6.9 | 5.6 | 4.4 | 3.4 | 2.7 | **1.5** |
| | 10 | 8.1 | 6.9 | 5.6 | 4.4 | 3.4 | 2.7 | **1.5** |
| 1000 | -40 | 7.4 | 6.2 | 5.0 | 3.9 | 2.9 | 2.2 | **1.0** |
| | -20 | 7.4 | 6.3 | 5.0 | 3.9 | 2.9 | 2.3 | **1.1** |
| | -10 | 7.5 | 6.4 | 5.1 | 4.0 | 3.0 | 2.3 | **1.1** |
| | -5 | 7.6 | 6.4 | 5.2 | 4.0 | 3.0 | 2.4 | **1.2** |
| | 0 | 7.6 | 6.5 | 5.2 | 4.1 | 3.1 | 2.4 | **1.2** |
| | 5 | 7.6 | 6.5 | 5.2 | 4.1 | 3.1 | 2.4 | **1.2** |
| | 10 | 7.7 | 6.5 | 5.2 | 4.1 | 3.1 | 2.4 | **1.2** |
| 2000 | -40 | 7.0 | 5.8 | 4.6 | 3.5 | 2.6 | **1.9** | **0.7** |
| | -20 | 7.1 | 6.0 | 4.7 | 3.6 | 2.7 | **2.0** | **0.8** |
| | -10 | 7.2 | 6.0 | 4.8 | 3.7 | 2.7 | **2.1** | **0.9** |
| | -5 | 7.2 | 6.1 | 4.8 | 3.7 | 2.7 | **2.1** | **0.9** |
| | 0 | 7.2 | 6.1 | 4.9 | 3.8 | 2.8 | 2.1 | **0.9** |
| | 5 | 7.2 | 6.1 | 4.9 | 3.8 | 2.8 | 2.1 | **0.9** |
| | 10 | 7.3 | 6.1 | 4.9 | 3.8 | 2.8 | 2.2 | **1.0** |

MAC_TO_2_-1_03

| Uncorrected Discontinued Approach Gradient [%] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR - Icing** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | **7600** | **8000** | **8500** | **9000** | **9500** | **9860** | **10600** |
| | | VREF [KIAS] | | | | | | |
| | | **109** | **111** | **115** | **118** | **121** | **124** | **128** |
| 3000 | -40 | 6.5 | 5.5 | 4.3 | 3.2 | 2.2 | 1.6 | 0.5 |
| | -20 | 6.7 | 5.6 | 4.4 | 3.3 | 2.4 | 1.7 | 0.6 |
| | -10 | 6.8 | 5.7 | 4.5 | 3.4 | 2.4 | 1.8 | 0.6 |
| | -5 | 6.8 | 5.7 | 4.5 | 3.4 | 2.4 | 1.8 | 0.6 |
| | 0 | 6.8 | 5.7 | 4.5 | 3.4 | 2.4 | 1.8 | 0.7 |
| | 5 | 6.8 | 5.7 | 4.5 | 3.4 | 2.5 | 1.8 | 0.7 |
| | 10 | 6.7 | 5.7 | 4.4 | 3.4 | 2.4 | 1.8 | 0.6 |
| 4000 | -40 | 6.2 | 5.1 | 3.9 | 2.9 | 1.9 | 1.3 | 0.2 |
| | -20 | 6.3 | 5.3 | 4.1 | 3.0 | 2.1 | 1.4 | 0.3 |
| | -10 | 6.4 | 5.3 | 4.1 | 3.0 | 2.1 | 1.5 | 0.3 |
| | -5 | 6.4 | 5.3 | 4.1 | 3.1 | 2.1 | 1.5 | 0.4 |
| | 0 | 6.4 | 5.3 | 4.1 | 3.1 | 2.1 | 1.5 | 0.4 |
| | 5 | 6.4 | 5.4 | 4.2 | 3.1 | 2.1 | 1.5 | 0.4 |
| | 10 | 6.1 | 5.0 | 3.9 | 2.8 | 1.9 | 1.3 | 0.2 |
| 5000 | -40 | 5.8 | 4.7 | 3.6 | 2.6 | 1.6 | 1.0 | -0.1 |
| | -20 | 5.9 | 4.9 | 3.7 | 2.7 | 1.8 | 1.2 | 0.0 |
| | -10 | 6.0 | 4.9 | 3.8 | 2.7 | 1.8 | 1.2 | 0.1 |
| | -5 | 6.0 | 4.9 | 3.8 | 2.7 | 1.8 | 1.2 | 0.1 |
| | 0 | 6.0 | 5.0 | 3.8 | 2.7 | 1.8 | 1.2 | 0.1 |
| | 5 | 6.0 | 4.9 | 3.8 | 2.7 | 1.8 | 1.2 | 0.1 |
| | 10 | 5.4 | 4.4 | 3.3 | 2.2 | 1.3 | 0.8 | -0.3 |
| 6000 | -40 | 5.4 | 4.4 | 3.3 | 2.3 | 1.4 | 0.8 | -0.3 |
| | -20 | 5.6 | 4.5 | 3.4 | 2.4 | 1.5 | 0.9 | -0.2 |
| | -10 | 5.6 | 4.6 | 3.4 | 2.4 | 1.5 | 0.9 | -0.2 |
| | -5 | 5.6 | 4.6 | 3.4 | 2.4 | 1.5 | 0.9 | -0.2 |
| | 0 | 5.6 | 4.5 | 3.4 | 2.4 | 1.5 | 0.9 | -0.2 |
| | 5 | 5.3 | 4.3 | 3.2 | 2.2 | 1.3 | 0.7 | -0.4 |
| | 10 | 4.5 | 3.5 | 2.4 | 1.5 | 0.6 | 0.1 | -1.0 |

MAC_TO_2_3_03

| Uncorrected Discontinued Approach Gradient [%] Dry Runway, Zero Slope, No Wind | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Flaps TO/APPR - Icing** | | | | | | | | |
| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 109 | 111 | 115 | 118 | 121 | 124 | 128 |
| 7000 | -40 | 5.1 | 4.1 | 3.0 | 2.0 | 1.1 | 0.5 | -0.6 |
| | -20 | 5.2 | 4.2 | 3.0 | 2.0 | 1.2 | 0.6 | -0.5 |
| | -10 | 5.2 | 4.2 | 3.0 | 2.1 | 1.2 | 0.6 | -0.5 |
| | -5 | 5.1 | 4.1 | 3.0 | 2.0 | 1.1 | 0.6 | -0.5 |
| | 0 | 5.1 | 4.1 | 3.0 | 2.0 | 1.1 | 0.5 | -0.5 |
| | 5 | 4.7 | 3.7 | 2.6 | 1.6 | 0.8 | 0.2 | -0.8 |
| | 10 | 3.6 | 2.7 | 1.6 | 0.7 | -0.1 | -0.6 | -1.6 |
| 8000 | -40 | 4.7 | 3.7 | 2.6 | 1.7 | 0.8 | 0.2 | -0.8 |
| | -20 | 4.8 | 3.8 | 2.7 | 1.7 | 0.8 | 0.3 | -0.8 |
| | -10 | 4.7 | 3.8 | 2.7 | 1.7 | 0.8 | 0.3 | -0.8 |
| | -5 | 4.7 | 3.7 | 2.6 | 1.7 | 0.8 | 0.2 | -0.8 |
| | 0 | 4.6 | 3.6 | 2.5 | 1.6 | 0.7 | 0.1 | -0.9 |
| | 5 | 3.9 | 3.0 | 1.9 | 1.0 | 0.2 | -0.4 | -1.4 |
| | 10 | 2.7 | 1.8 | 0.9 | 0.0 | -0.8 | -1.3 | -2.2 |
| 9000 | -40 | 4.4 | 3.4 | 2.3 | 1.4 | 0.5 | 0.0 | -1.0 |
| | -20 | 4.4 | 3.4 | 2.3 | 1.4 | 0.5 | 0.0 | -1.0 |
| | -10 | 4.3 | 3.3 | 2.3 | 1.3 | 0.5 | -0.1 | -1.1 |
| | -5 | 4.3 | 3.3 | 2.3 | 1.3 | 0.5 | -0.1 | -1.1 |
| | 0 | 4.0 | 3.0 | 2.0 | 1.1 | 0.2 | -0.3 | -1.3 |
| | 5 | 3.1 | 2.2 | 1.2 | 0.3 | -0.5 | -1.0 | -1.9 |
| | 10 | 1.9 | 1.1 | 0.2 | -0.7 | -1.4 | -1.9 | -2.8 |
| 10000 | -40 | 4.0 | 3.0 | 2.0 | 1.1 | 0.2 | -0.3 | -1.3 |
| | -20 | 3.9 | 3.0 | 2.0 | 1.0 | 0.2 | -0.3 | -1.3 |
| | -10 | 3.9 | 2.9 | 1.9 | 1.0 | 0.1 | -0.4 | -1.4 |
| | -5 | 3.9 | 3.0 | 1.9 | 1.0 | 0.2 | -0.4 | -1.4 |
| | 0 | 3.4 | 2.5 | 1.5 | 0.6 | -0.2 | -0.8 | -1.7 |
| | 5 | 2.2 | 1.4 | 0.4 | -0.4 | -1.2 | -1.6 | -2.5 |
| | 10 | 1.1 | 0.4 | -0.5 | -1.3 | -2.0 | -2.5 | -3.3 |

MAC_TO_2_7_03

**Uncorrected Balked Landing Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR - Icing**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 109 | 111 | 115 | 118 | 121 | 124 | 128 |
| -1000 | -40 | 29.5 | 27.1 | 24.4 | 22.1 | 20.0 | 18.6 | 16.0 |
| | -20 | 29.5 | 27.1 | 24.5 | 22.1 | 20.0 | 18.6 | 16.1 |
| | -10 | 29.6 | 27.2 | 24.5 | 22.2 | 20.1 | 18.7 | 16.1 |
| | -5 | 29.7 | 27.3 | 24.6 | 22.3 | 20.1 | 18.8 | 16.2 |
| | 0 | 29.8 | 27.4 | 24.7 | 22.3 | 20.2 | 18.8 | 16.3 |
| | 5 | 29.9 | 27.5 | 24.8 | 22.4 | 20.3 | 18.9 | 16.3 |
| | 10 | 29.9 | 27.5 | 24.8 | 22.5 | 20.3 | 18.9 | 16.4 |
| Sea Level | -40 | 29.3 | 26.9 | 24.3 | 21.9 | 19.8 | 18.4 | 15.9 |
| | -20 | 29.4 | 27.0 | 24.3 | 22.0 | 19.9 | 18.5 | 16.0 |
| | -10 | 29.5 | 27.1 | 24.4 | 22.1 | 20.0 | 18.6 | 16.0 |
| | -5 | 29.6 | 27.2 | 24.5 | 22.1 | 20.0 | 18.7 | 16.1 |
| | 0 | 29.7 | 27.3 | 24.6 | 22.2 | 20.1 | 18.7 | 16.2 |
| | 5 | 29.7 | 27.3 | 24.6 | 22.3 | 20.2 | 18.8 | 16.2 |
| | 10 | 29.8 | 27.4 | 24.7 | 22.3 | 20.2 | 18.8 | 16.3 |
| 1000 | -40 | 28.4 | 26.1 | 23.5 | 21.2 | 19.1 | 17.8 | 15.3 |
| | -20 | 28.6 | 26.2 | 23.6 | 21.3 | 19.2 | 17.9 | 15.4 |
| | -10 | 28.7 | 26.4 | 23.7 | 21.4 | 19.3 | 18.0 | 15.5 |
| | -5 | 28.8 | 26.4 | 23.8 | 21.5 | 19.4 | 18.0 | 15.6 |
| | 0 | 28.9 | 26.5 | 23.9 | 21.5 | 19.5 | 18.1 | 15.6 |
| | 5 | 28.9 | 26.6 | 23.9 | 21.6 | 19.5 | 18.1 | 15.6 |
| | 10 | 29.0 | 26.6 | 24.0 | 21.6 | 19.5 | 18.2 | 15.7 |
| 2000 | -40 | 27.6 | 25.3 | 22.8 | 20.5 | 18.5 | 17.2 | 14.7 |
| | -20 | 27.8 | 25.5 | 23.0 | 20.7 | 18.7 | 17.3 | 14.9 |
| | -10 | 28.0 | 25.7 | 23.1 | 20.8 | 18.8 | 17.5 | 15.0 |
| | -5 | 28.0 | 25.7 | 23.2 | 20.9 | 18.8 | 17.5 | 15.0 |
| | 0 | 28.1 | 25.8 | 23.2 | 20.9 | 18.9 | 17.6 | 15.1 |
| | 5 | 28.1 | 25.8 | 23.2 | 21.0 | 18.9 | 17.6 | 15.1 |
| | 10 | 28.2 | 25.9 | 23.3 | 21.0 | 19.0 | 17.6 | 15.2 |

BLC_TO_2_-1_03

**Uncorrected Balked Landing Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR - Icing**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
| | | VREF [KIAS] | | | | | | |
| | | 109 | 111 | 115 | 118 | 121 | 124 | 128 |
| 3000 | -40 | 26.8 | 24.5 | 22.0 | 19.8 | 17.9 | 16.6 | 14.2 |
| | -20 | 27.1 | 24.8 | 22.3 | 20.1 | 18.1 | 16.8 | 14.4 |
| | -10 | 27.2 | 24.9 | 22.4 | 20.2 | 18.2 | 16.9 | 14.5 |
| | -5 | 27.2 | 25.0 | 22.4 | 20.2 | 18.2 | 16.9 | 14.5 |
| | 0 | 27.3 | 25.0 | 22.5 | 20.2 | 18.2 | 16.9 | 14.5 |
| | 5 | 27.3 | 25.0 | 22.5 | 20.3 | 18.3 | 17.0 | 14.5 |
| | 10 | 27.1 | 24.9 | 22.3 | 20.1 | 18.1 | 16.8 | 14.4 |
| 4000 | -40 | 26.0 | 23.8 | 21.3 | 19.2 | 17.2 | 15.9 | 13.6 |
| | -20 | 26.3 | 24.1 | 21.6 | 19.4 | 17.5 | 16.2 | 13.8 |
| | -10 | 26.4 | 24.2 | 21.7 | 19.5 | 17.5 | 16.2 | 13.9 |
| | -5 | 26.4 | 24.2 | 21.7 | 19.5 | 17.6 | 16.3 | 13.9 |
| | 0 | 26.4 | 24.2 | 21.7 | 19.5 | 17.6 | 16.3 | 13.9 |
| | 5 | 26.5 | 24.2 | 21.8 | 19.6 | 17.6 | 16.3 | 14.0 |
| | 10 | 25.8 | 23.6 | 21.2 | 19.0 | 17.1 | 15.8 | 13.5 |
| 5000 | -40 | 25.2 | 23.0 | 20.6 | 18.5 | 16.6 | 15.3 | 13.1 |
| | -20 | 25.5 | 23.3 | 20.9 | 18.8 | 16.8 | 15.6 | 13.3 |
| | -10 | 25.6 | 23.4 | 21.0 | 18.8 | 16.9 | 15.6 | 13.3 |
| | -5 | 25.6 | 23.4 | 21.0 | 18.8 | 16.9 | 15.7 | 13.3 |
| | 0 | 25.6 | 23.4 | 21.0 | 18.9 | 16.9 | 15.7 | 13.4 |
| | 5 | 25.6 | 23.4 | 21.0 | 18.9 | 17.0 | 15.7 | 13.4 |
| | 10 | 24.4 | 22.3 | 20.0 | 17.9 | 16.0 | 14.8 | 12.5 |
| 6000 | -40 | 24.4 | 22.3 | 20.0 | 17.9 | 16.0 | 14.8 | 12.5 |
| | -20 | 24.7 | 22.6 | 20.2 | 18.1 | 16.2 | 15.0 | 12.7 |
| | -10 | 24.8 | 22.6 | 20.3 | 18.2 | 16.3 | 15.0 | 12.8 |
| | -5 | 24.8 | 22.6 | 20.3 | 18.2 | 16.3 | 15.1 | 12.8 |
| | 0 | 24.7 | 22.6 | 20.2 | 18.1 | 16.3 | 15.0 | 12.8 |
| | 5 | 24.2 | 22.1 | 19.8 | 17.7 | 15.9 | 14.7 | 12.4 |
| | 10 | 22.5 | 20.5 | 18.3 | 16.3 | 14.5 | 13.3 | 11.2 |

BLC_TO_2_3_03

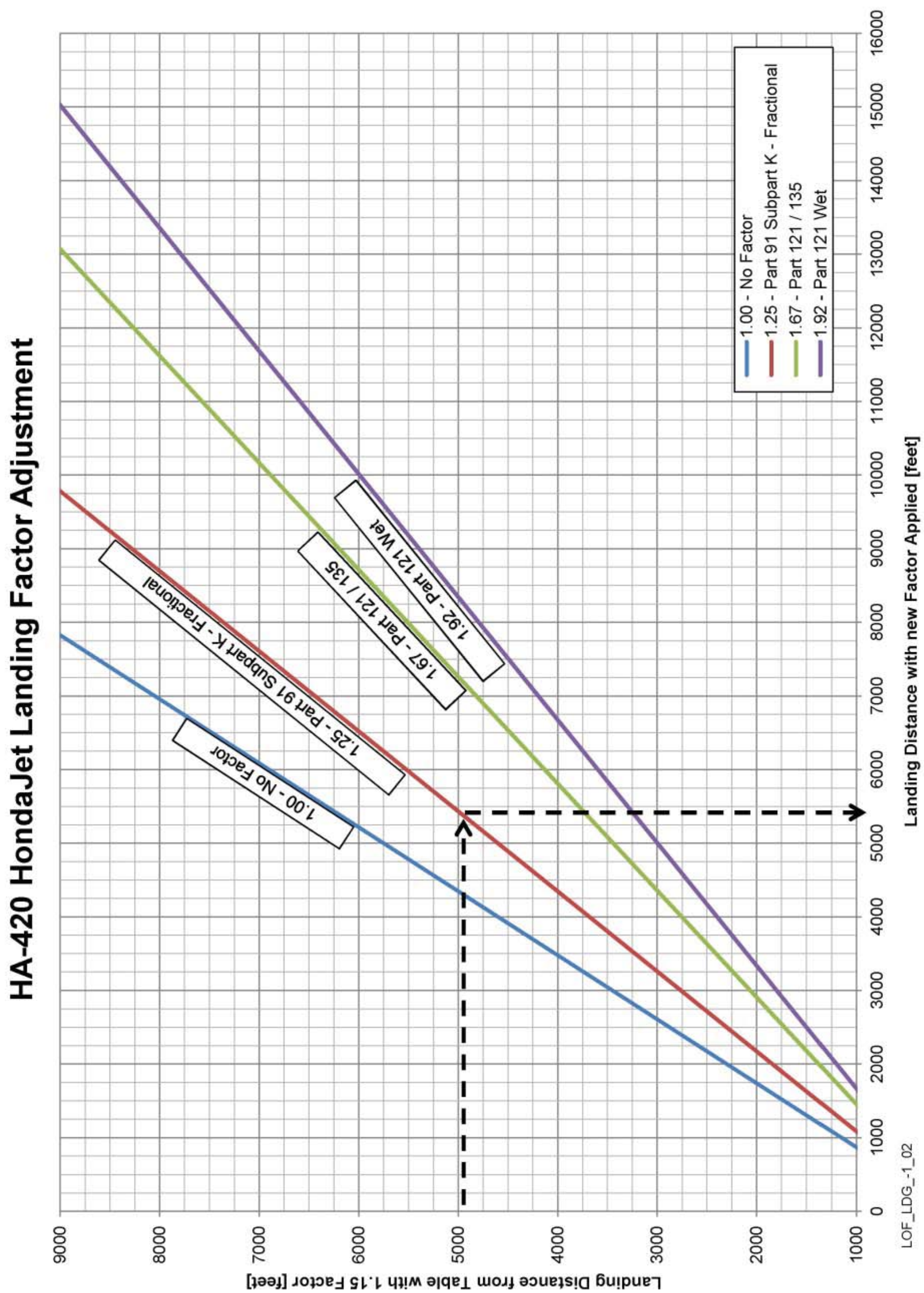
**Uncorrected Balked Landing Gradient [%]**
**Dry Runway, Zero Slope, No Wind**

**Flaps TO/APPR - Icing**

| ALT [ft] | TEMP [°C] | Landing Weight [lb] 7600 | 8000 | 8500 | 9000 | 9500 | 9860 | 10600 |
|---|---|---|---|---|---|---|---|---|
| | | VREF [KIAS] 109 | 111 | 115 | 118 | 121 | 124 | 128 |
| 7000 | -40 | 23.7 | 21.6 | 19.3 | 17.3 | 15.4 | 14.2 | 12.0 |
| | -20 | 23.9 | 21.8 | 19.5 | 17.4 | 15.6 | 14.4 | 12.2 |
| | -10 | 23.9 | 21.8 | 19.5 | 17.5 | 15.6 | 14.4 | 12.2 |
| | -5 | 23.9 | 21.8 | 19.5 | 17.4 | 15.6 | 14.4 | 12.2 |
| | 0 | 23.8 | 21.7 | 19.4 | 17.4 | 15.5 | 14.3 | 12.1 |
| | 5 | 22.9 | 20.8 | 18.6 | 16.6 | 14.8 | 13.6 | 11.5 |
| | 10 | 20.7 | 18.8 | 16.6 | 14.7 | 13.1 | 11.9 | 9.9 |
| 8000 | -40 | 23.0 | 20.9 | 18.7 | 16.7 | 14.9 | 13.7 | 11.5 |
| | -20 | 23.1 | 21.0 | 18.8 | 16.8 | 15.0 | 13.8 | 11.6 |
| | -10 | 23.0 | 21.0 | 18.7 | 16.7 | 14.9 | 13.7 | 11.6 |
| | -5 | 22.9 | 20.9 | 18.7 | 16.7 | 14.9 | 13.7 | 11.5 |
| | 0 | 22.7 | 20.7 | 18.4 | 16.4 | 14.7 | 13.5 | 11.3 |
| | 5 | 21.3 | 19.4 | 17.2 | 15.3 | 13.6 | 12.5 | 10.4 |
| | 10 | 18.9 | 17.1 | 15.1 | 13.3 | 11.7 | 10.6 | 8.7 |
| 9000 | -40 | 22.3 | 20.3 | 18.0 | 16.1 | 14.3 | 13.2 | 11.0 |
| | -20 | 22.3 | 20.3 | 18.0 | 16.1 | 14.3 | 13.2 | 11.0 |
| | -10 | 22.1 | 20.1 | 17.9 | 16.0 | 14.2 | 13.1 | 10.9 |
| | -5 | 22.1 | 20.1 | 17.9 | 15.9 | 14.2 | 13.0 | 10.9 |
| | 0 | 21.4 | 19.5 | 17.3 | 15.4 | 13.7 | 12.5 | 10.5 |
| | 5 | 19.6 | 17.7 | 15.7 | 13.8 | 12.2 | 11.1 | 9.2 |
| | 10 | 17.3 | 15.5 | 13.6 | 11.9 | 10.4 | 9.4 | 7.5 |
| 10000 | -40 | 21.5 | 19.6 | 17.4 | 15.5 | 13.7 | 12.6 | 10.5 |
| | -20 | 21.4 | 19.5 | 17.3 | 15.4 | 13.6 | 12.5 | 10.4 |
| | -10 | 21.3 | 19.3 | 17.2 | 15.2 | 13.5 | 12.4 | 10.3 |
| | -5 | 21.3 | 19.3 | 17.2 | 15.3 | 13.5 | 12.4 | 10.3 |
| | 0 | 20.3 | 18.4 | 16.3 | 14.4 | 12.7 | 11.6 | 9.6 |
| | 5 | 17.9 | 16.1 | 14.1 | 12.4 | 10.8 | 9.8 | 8.0 |
| | 10 | 15.7 | 14.0 | 12.2 | 10.6 | 9.1 | 8.2 | 6.4 |

BLC_TO_2_7_03

## Operational Factors for Landing Distance



## TURNAROUND

### Landing Brake Energy

A minimum of 30 minutes between landing and takeoff in the event of the following sequence:

1. Maximum landing weight full stop.
2. Takeoff in 15 minutes or less.
3. Less than 1 hour flight.

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# SECTION 6

# WEIGHT AND BALANCE

## TABLE OF CONTENTS

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# WEIGHT AND BALANCE

## INTRODUCTION

This section of the Airplane Flight Manual contains the HA-420 model (HondaJet) Weight and Balance instructions, forms and data required by 14 CFR Part 23.1583 Operating limitations (Airplane Flight Manual).

Specifically this section complies with the following 14 CFR regulations:

1. Weight limits
2. Empty weight and corresponding center of gravity
3. Weight and center of gravity
4. Loading information

Each airplane will have a specific Basic Empty Weight (BEW) and Balance Form in the "as delivered" from manufacturer condition, along with an example loading in the "as delivered" condition as shown in WEIGHING INSTRUCTIONS.

Also included are the forms and data necessary to compute BEW and perform loading calculations along with the airplane Equipment List.

## WEIGHT AND BALANCE DEFINITIONS

| Term | Definitions |
|---|---|
| Approved Loading Envelope | Those combinations of airplane weight and center of gravity which define the limits beyond which loading is not approved |
| Basic Empty Weight | The completed airplane (all structure and systems) including enclosed fluids such as unusable fuel, engine oil, hydraulic oil, ECS refrigerants and oxygen. BEW corresponds to the 14 CFR Part 23.29 description |
| Center of Gravity (CG) | The point at which the weight of an item can be considered concentrated for weight and balance purposes |
| CG Limits | The CG locations within which the airplane must be operated at a given weight |
| Empty Weight | The airplane weight prior to fuel or engine oil being added. Empty weight includes all permanently installed equipment, full system operating fluids and fixed ballast. Essentially manufacturers "dry" weight of the completed airplane |
| Engine Oil (Drainable) | The amount of oil that can be drained from the engine |
| Fuselage Station (F-Sta) | The longitudinal distance (in inches) from the zero fuselage reference data plane to a specific point |

| | |
|---|---|
| Jack Point(s) | Appropriate position(s) specified by the airplane manufacturer as correct point for jacking the airplane during weighing or maintenance operation |
| Leveling Point(s) | Those points which are used to level the airplane in pitch and roll during the weighing operation |
| Maximum Landing Weight (MLW) | The maximum weight of the airplane allowed by structural design that should normally not be exceeded at touchdown |
| Maximum Ramp Weight (MRW) | The highest weight of the airplane allowed by structural design that should not be exceeded |
| Maximum Takeoff Weight (MTOW) | The highest permissible weight of the airplane at break release for takeoff (ramp weight minus taxi and run up fuel = MTOW) |
| Maximum Zero Fuel Weight (MZFW) | The Maximum permissible weight of the loaded airplane before usable fuel is added |
| Moment (mom) | A measure of rotational tendency of an item about a specified line mathematically equal to the product of the weight and fuse station (weight * F-Sta = moment) |
| Operating Weight Empty (OWE) | BEW plus crew and mission specific equipment (does not include fuel) |

| | |
|---|---|
| Payload | Payload is any combination of items (passengers, baggage or consumables) added to the airplane for mission purposes. Fuel is not considered payload |
| Ramp Weight | The airplane weight at engine start after loading is complete |
| Tare | The weight indicated by a scale prior to applied load, or, the weight indicated by a scale when the load is removed. (Indicated weight minus tare = actual weight) |
| Unusable Fuel | The quantity of fuel remaining in the tanks that cannot be used by the aircraft engines when in flight. Unusable fuel is further divided into two areas:<br>• **Unusable/Drainable** The amount of fuel that can be drained from the fuel tanks when starting with the unusable quantity<br>• **Unusable/Undrainable** The amount of fuel remaining in the tanks after draining and "sumping" also known as "Trapped Fuel" |
| Zero Fuel Weight | Airplane operating weight plus payload without usable fuel |

# WEIGHING INSTRUCTIONS

## Weighing Procedure

1. Airplane must be weighed in an enclosed area.
2. Ventilation system (heating or cooling) must not impinge on the airplane.
3. Floor must be level (slope not to exceed $^{1}/_{4}$" per foot).
4. Airplane must be defueled and drained per normal maintenance procedure to obtain BEW.
5. Each engine must have full Engine Oil.
6. Flaps to be in the retracted position.
7. Note the airplane configuration prior to weighing and any overages or shortages.

   Additional or missing Equipment List Items, Life Rafts, changes to Interior configuration, Potable Fluids, Consumables, etc. should be recorded on page 2 of the Basic Empty Weight and Balance Form. These overage and shortage items will reconcile the "as weighed" value to BEW.
8. Check for current weighing device calibration and allow sufficient "warm up" time per manufacturer's instructions and ensure all readings are stable prior to applying load.
9. If weighing on platform scales (weight on wheels) measurements will be taken from a known Fuselage Reference Point (FRP). If weighing on Jacking points, refer to Basic Empty Weight and Balance Form. The FRP is the intersection of the wing leading edge to the fuselage fairing and corresponds to F-Sta 222.454".

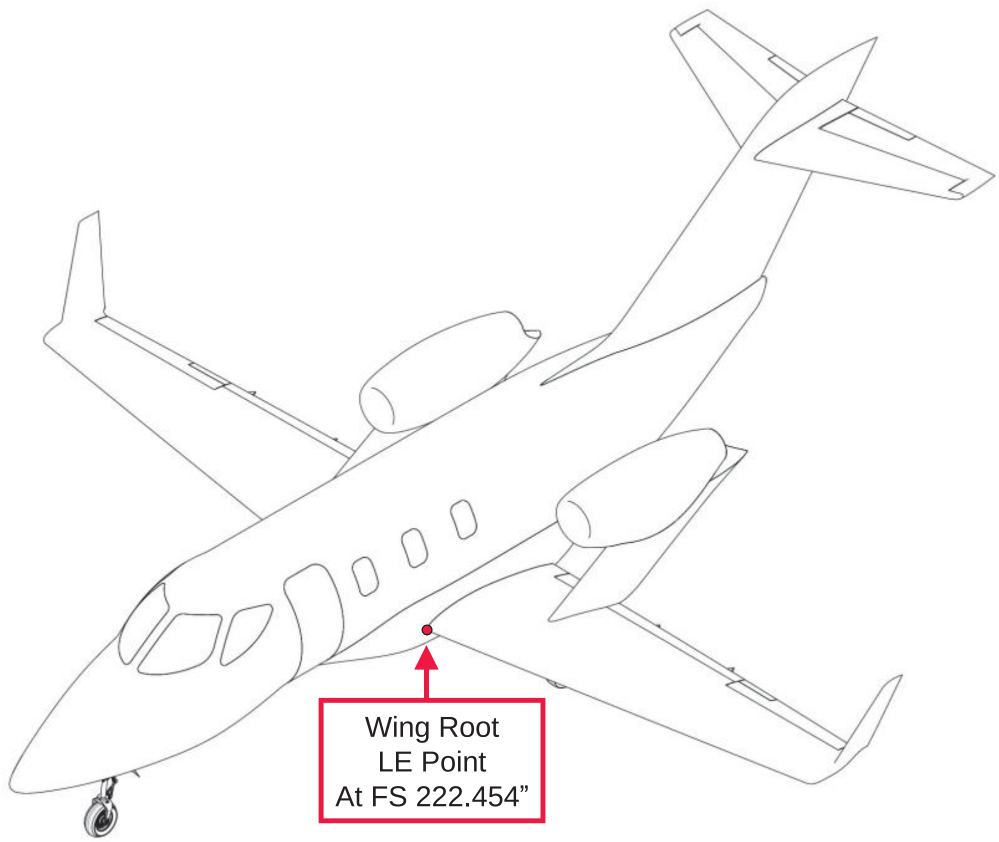



**Figure 14. Weighing Procedure – Wing Root LE Point**

10. Airplane must be leveled in Pitch and Roll by the use of an inclinometer (or other level) placed on the marked Cabin Floor Panel

    ↑ LEVEL AIRCRAFT HERE ↑

11. Remove Inclinometer/Leveling device and close passenger door.
12. Note reactions (scale or load cell readings) at each location and enter on "Basic Empty Weight and Balance Form” (see example on following pages).
13. If weighing on jack points with load cells no distance measurements are required.

14. If weighing on Landing gear, obtain by measuring the landing gear contact (reaction) points and enter the values in the F-Sta column of the "as weighed" table on the BEW and Balance Form (see example on following pages).

    Static Landing Gear contact points are shown on the BEW and Balance form, however due to trailing link configuration and payload variation it is better to verify reaction points by measurement. For detailed measuring instructions; see **Measuring Landing Gear Tire Contact Points**.

15. The airplane "as weighed" condition is computed on Basic Empty Weight and Balance Form from reactions (noted in step 12) and measurements (taken in step 14). Add and subtract any overage or shortage items to "as weighed" to obtain BEW.

    If there are many overages and shortages; utilize BEW and Balance Form sheet 2.

16. Measuring Landing Gear Tire Contact Points. One method is shown below in steps a through h.

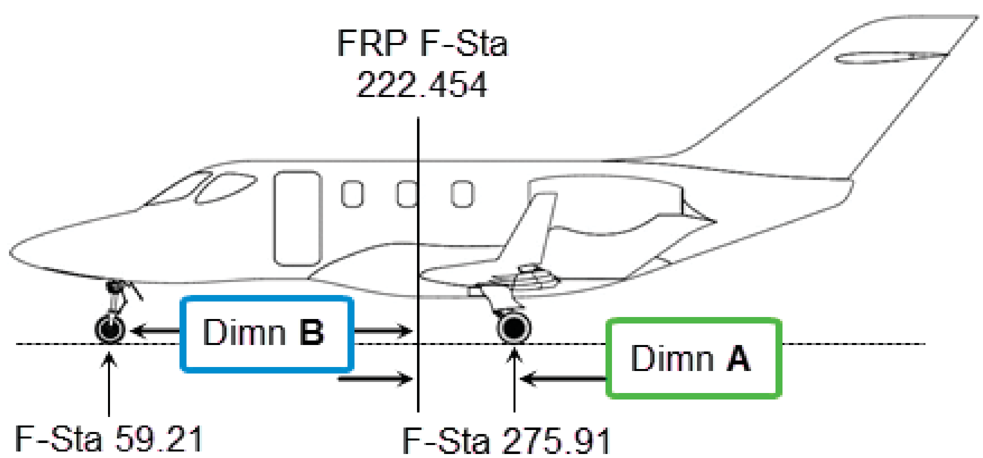



**Figure 15. Method to Measure Landing Gear Tire Contact Points**

a) Mark the floor at the center of each main gear tire, a plumb line dropped from the axle center will give the correct reaction (contact) point.

b) Mark the floor at the center of each side of the NLG tire, employing the same method as the main gear.

c) Mark a point on the floor below the FRP on the left and right side of the fuselage using a similar method as the gear.

d) Measure the perpendicular distance between the left and right FRP points and the MLG points, add the two numbers, then divide by two. This is dimension (Dimn) A.

Example measurements of 53.33” and 53.35” give Dimn A = 53.34”.

e) Add Dimn A to the FRP value and enter the value in the “Main Total” row F-Sta column intersect cell of the BEW and Balance Form.

For example, 222.454 + 53.34 = 275.79 (see example table below).

f) Measure the perpendicular distance between the left and right NLG points and the FRP points, add the two numbers, then divide by two. This is Dimension (Dimn) B.

Example measurements of 163.82” and 163.86” give Dimn B = 163.84”.

g) Minus Dimn B from the FRP value and enter the value in the “Nose” F-Sta cell of the BEW and Balance Form. See entry example below.

For example, 222.454 - 163.84 = 58.61

h) Landing Gear Reaction Point Table Example

| Reaction Points | | Scale Reading | Tare | Net Weight | F-Sta | Mom/100 | % MAC |
|---|---|---|---|---|---|---|---|
| **Quality Stamp** | Left Main | 3,231.0 | 6.2 | 3,224.8 | | | |
| | Right Main | 3,218.0 | 5.9 | 3,212.1 | | | |
| | Main Total | | | 6,436.9 | **275.79** | 17,752 | |
| | Nose | 719.0 | 6.9 | 712.1 | **58.61** | 417 | |
| As Weighed Total (lb) | | | | 7,149.0 | 254.15 | 18,169 | 36.76% |

17. After inputting the individual weight values and reaction points take note of any Tare weight at each reaction point and enter the value on the form.

**NOTE** Tare weight is typically "chock weight" or a reading other than zero prior to applying load. If the Tare weight is negative, add the value to the scale reading to obtain net weight. If the Tare weight is positive, subtract the value from the scale reading to obtain net weight.

18. Add the Left and Right Main net weights together and input the result in Net Weight Main Total cell.
19. Using the F-Sta values (obtained either from Jack Points, Static reference or actual measurement), multiply this value by the net weight and divide by 100 and add this value in the Mom/100 column.
20. Add the Nose and Main Net weights together to obtain the "As weighed Total".
21. Add the Main Total Mom/100 and Nose Mom/100 values together and input value into the "As weighed Total" Mom/100
22. Divide the As weighed Total mom/100 by the As Weighed Total Net and multiply by 100 to obtain the F-Sta CG
23. To obtain the as weighed % MAC value use the following formula

**Equation 1: As Weighed % MAC Formula**

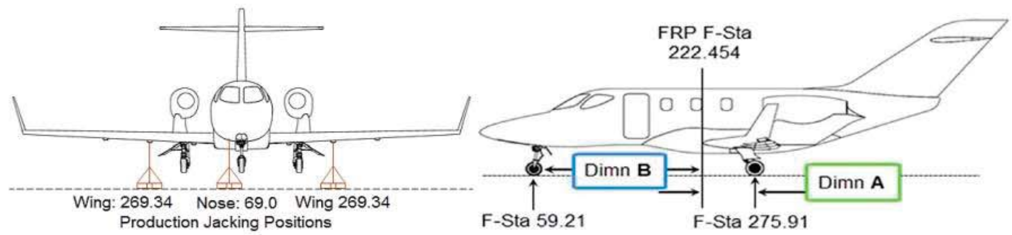
$$As\ Weighed\ \%\ MAC = \frac{(As\ Weighed\ F_{sta}CG - 232.20)}{59.72} * 100$$

24. The Basic Empty Weight can now be computed by adding and subtracting the overages and shortages (noted step 15) to the as weighed total. Overages should be subtracted from the as weighed to obtain BEW. Shortages should be added to the as weighed to obtain BEW.

25. Basic Empty Weight and Balance Form (example) – A blank form is available in Appendix A.

Sheet 1 of 2

HA-420 - Basic Empty Weight & Balance Form




**Location:** HACI R&D Hangar **Model:** HA-420 **Serial #:** P11

**Date:** 4/15/2015 **Weighed by:**

| Reaction Points | | Scale Reading | Tare | Net Weight | F-Sta | Mom/100 | % MAC |
|---|---|---|---|---|---|---|---|
| **Quality Stamp** | Left Main | 3,231.0 | 6.2 | 3,224.8 | | | |
| | Right Main | 3,218.0 | 5.9 | 3,212.1 | | | |
| | Main Total | | | 6,436.9 | **275.79** | 17,752 | |
| | Nose | 719.0 | 6.9 | 712.1 | **58.61** | 417 | |
| As Weighed Total (lb) | | | | 7,149.0 | 254.15 | 18,169 | 36.76% |

| Measurements: | Input | | static ref. |
|---|---|---|---|
| Dimn **A** *FRP to Center of Main Gear | 53.34 | inches | 53.55 |
| Dimn **B** *FRP to Center of Nose Gear | 163.84 | inches | 163.21 |

| Additions or Subtractions to as weighed condition. | lb | F-Sta | Mom/100 | % MAC |
|---|---|---|---|---|
| Subtract: | | | | |
| Nose Jack Pad | 0.7 | 69.00 | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| Add: | | | | |
| Unusable Fuel (Left Wing) | 18.0 | 258.00 | 46 | |
| Unusable Fuel (Right Wing) | 18.0 | 258.00 | 46 | |
| Unusable Fuel (Ctr) | 8.9 | 247.06 | 22 | |
| Crew Headset | 1.5 | 125.07 | 2 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| **Basic Empty Weight** | 7,194.7 | 254.15 | 18,286 | 36.76% |

420AFM06_2514A

**Figure 16. Basic Empty Weight and Balance Form Sheet 1 (Example)**

26. Basic Empty Weight and Balance Form Sheet 2 (example) – A blank form is available in Appendix A.

    This form is used to record and reconcile specific configurations, and to detail items too numerous for sheet 1.

Sheet 2 of 2

HA-420 - Basic Empty Weight & Balance Form

Extra worksheet to document and capture items weighed but not part of basic empty weight (Overages) and basic empty weight items not in airplane at time of weighing (Shortages).

| Additions or Subtractions to as weighed condition. | lb | F-Sta | Moment/100 | % MAC |
|---|---|---|---|---|
| Subtract: (Overages) | | | | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| **Total Subtractions** | 0.0 | | 0 | |
| Add: (Shortages) | | | | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| | | | 0 | |
| **Total Additions** | 0.0 | | 0 | |

Measuring Equipment:

**Scale Type:** In-Ground Floor Scales **Increments/Accuracy:** better than 0.1%

**Model Number:** IND780 5607882-5FK **Calibration Date:** May 26, 2015

Airplane Configuration: *Circle one **Flaps Retracted:** Yes /No*

**Fuel Qty:** 0 lb/ gallon* **Defueled:** Yes /No* **Drained:** Yes /No*

**Level Info:** HA-2485 07/31/15 HA-3356 4/30/16 **Lateral:** Yes /No* 0.1° **Longitudinal:** Yes /No* 0.02°

Notes/Remarks:

P11 BEW determination. Plumbob CG method.

420AFM06_2517A

**Figure 17. Basic Empty Weight and Balance Form Sheet 2 (Example)**

27. Basic Empty Weight and Balance Record – A blank form is available in Appendix A.

    A running total of BEW should be kept to record changes in equipment and its effect on weight and balance; see the following example.

Honda Aircraft Model: HA-420
Serial #: P14

Basic Empty Weight and Balance Record

| Date day/mon/year | Item Add | Item Rem | Item Description or Modification | Added weight (lbs) | Added arm (in) | Added moment (lbs.in)/100 | Removed weight (lbs) | Removed arm (in) | Removed moment (lbs.in)/100 | Current BEW Total weight (lbs) | Current BEW Total arm (in) | Current BEW Total moment (lbs.in)/100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-Jan-2015 | | | Weight & balance by airplane manufacturer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7,000.0 | 250.00 | 17,500.0 |
| 12-Mar-2015 | | ✓ | Removed Rudder for Rebalancing | 0.0 | 0.0 | 0.0 | -55.0 | 446.3 | -245.5 | 6,945.0 | 248.45 | 17,254.5 |
| 16-Mar-2015 | ✓ | | Added Re-balanced Rudder with production mass balance configuration. | 56.0 | 446.3 | 249.9 | 0.0 | 0.0 | 0.0 | 7,001.0 | 250.03 | 17,504.5 |

EXAMPLE

Figure 18. Basic Empty Weight and Balance Record

# LOADING INSTRUCTIONS

## GENERAL

It is the airplane owner/operator's responsibility to ensure the airplane is correctly loaded. Honda Aircraft Company will furnish the BEW and all necessary data to compute specific airplane loadings at the time of delivery. All subsequent changes to the airplane BEW and loading configurations are the responsibility of the owner/operator.

## LIMITS

The airplane weight and CG (for all flight and ground operations) must be maintained within the approved weight and CG limits described in **CENTER OF GRAVITY LIMITS**.

## UNITS

All airplane and individual weight information is given in pounds, Stations and measurements are in inches and moments are in inch-pounds divided by one hundred (in-lbs/100).

## FORMULA

When performing the computing procedure the following formulae display the relationship between the respective CG terms.

| | |
|---|---|
| **F-Sta** | Distance from Fuselage reference plane in inches |
| **F-Sta to % MAC** | (F-Sta – 232.20) / 59.72 * 100 |
| **F-Sta to Moment** | (F-Sta * weight) / 100 |

## LOADING FORM COMPUTING PROCEDURE

Enter the latest BEW data from either the Basic Empty Weight and Balance Form or the Basic Empty Weight and Balance Record onto Line 1 of the Weight and Balance Loading Form.

1. Enter the Crew, Passenger and Payload weights onto lines 2 through 15. A diagram of the interior floorplan/payload location (based on the delivered configuration) can be found in the next section (**Cabin Floorplan**). Payload weight and moment data is included in **Payload Data**.
2. Total the weight of lines 1-15 to determine Zero Fuel Weight (ZFW). ZFW must not exceed 8,800 lbs.
3. Calculate ZFW CG by totaling the moments of lines 1-15, dividing by the weight obtained in step 2 and multiplying by 100. Ensure CG is within ZFW limits; payload may have to be relocated or removed to respect limits (forward and aft ZFW limits are shown graphically in **Weight and CG Envelope** and numerically in **Loading Envelope Limits**).
4. Enter the Fuel weight and moment data on line 17. Corresponding moments for fuel loads can be found in **USABLE FUEL**.
5. Total lines 16 and 17 (ZFW plus Fuel) to obtain Ramp Weight. Ramp weight must not exceed 10,680 lbs Check the Ramp Weight and CG is within the Loading Envelope Limits.
6. Enter Taxi/Run up fuel on line 19 and subtract from line 18 to obtain Takeoff Weight. Takeoff weight must not exceed 10,600 lbs.
7. Complete Loading Form by entering estimated post flight fuel remaining on line 22 (usable fuel moments can be found in **USABLE FUEL**). Add line 22 values to line 21 (same as line 16 – Zero Fuel weight) to determine Landing Weight. Landing weight must not exceed 9,860 lbs.

8. Weight and Balance Loading Form (see Loading example below). Loading example includes: 2 Crew, 4 Cabin Passengers, Aft Baggage and a fuel load of 2144 lb. Blank forms are available in Appendix A.

| Weight & Balance Loading Form | | | | | |
|---|---|---|---|---|---|
| | | | | **HA-420 Serial#** | **P12** |
| | | | | **Date:** | **2/16/2015** |
| Line | Item Description | weight (lbs) | arm (in) | moment (lbs.in)/100 | %MAC |
| | | | | | |
| 1 | **Basic Empty Weight** | **7,000.0** | **253.00** | **17,710.0** | **34.83%** |
| | | | | | |
| 2 | Pilot | 200.0 | 121.40 | 242.8 | |
| 3 | Copilot | 200.0 | 121.40 | 242.8 | |
| 4 | Crew Equipment | | | 0.0 | |
| 5 | Provisions-Cabinet | 15.0 | 142.50 | 21.4 | |
| 6 | **Operating Weight** | **7,415.0** | **245.68** | **18,217.0** | **22.57%** |
| | | | | | |
| 7 | Side Facing Passenger | | 158.71 | 0.0 | |
| 8 | Fwd LH Pasenger | 170.0 | 188.37 | 320.2 | |
| 9 | Fwd RH Passenger | 170.0 | 188.37 | 320.2 | |
| 10 | Aft LH Passenger | 170.0 | 239.43 | 407.0 | |
| 11 | Aft RH Passenger | 170.0 | 239.43 | 407.0 | |
| 12 | Miscellaneous | | | 0.0 | |
| 13 | Cabin Baggage | | | 0.0 | |
| 14 | Aft Baggage (Max 400) | 150.0 | 311.65 | 467.5 | |
| 15 | Fwd Baggage (Max 100) | | 54.30 | 0.0 | |
| 16 | **Zero Fuel Weight (Limit 8,800)** | **8,245.0** | **244.26** | **20,139.0** | **20.19%** |
| | | | | | |
| 17 | Fuel Weight | 2,144.0 | | 5,516.0 | |
| 18 | **Ramp Weight (Limit 10,680)** | **10,389.0** | **246.94** | **25,655.0** | **24.69%** |
| | | | | | |
| 19 | Minus Taxi/Run-up Fuel | 100.0 | 288.59 | 288.6 | |
| **20** | **Take-off Weight (Limit 10,600)** | **10,289.0** | **246.54** | **25,366.4** | **24.01%** |
| | | | | | |
| 21 | Zero Fuel Weight (s/as line 16) | 8245.0 | 244.26 | 20139.0 | |
| 22 | Estimated Fuel Remaining | 1,005.0 | | 2,595.0 | |
| 23 | **Landing Weight (Limit 9,860)** | **9,250.0** | **245.77** | **22,734.0** | **22.73%** |

**Figure 19. Weight and Balance Loading Form (Example)**

# CABIN FLOORPLAN / PAYLOAD DATA

## CABIN FLOORPLAN

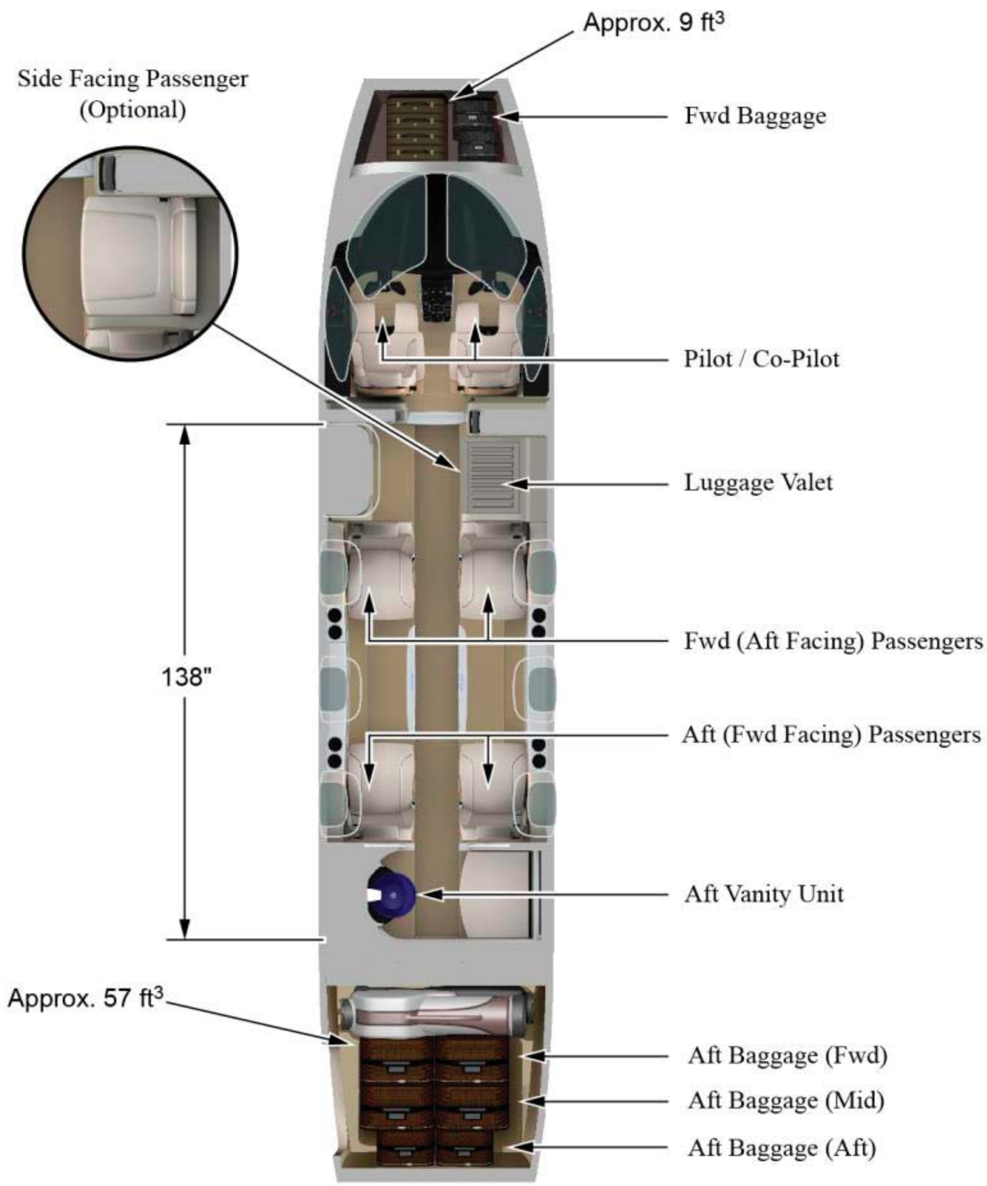



**Figure 20. Cabin Floorplan**

# PAYLOAD DATA

## Occupants

| Weight | Pilot / Copilot | | Side Face Passenger | | Fwd Passengers | | Rear Passengers | |
|---|---|---|---|---|---|---|---|---|
| | F-Sta | mom/100 | F-Sta | mom/100 | F-Sta | mom/100 | F-Sta | mom/100 |
| (lb) | (in) | (lb.in) | (in) | (lb.in) | (in | (lb) | (in) | (lb.in) |
| 80 | 121.40 | 97.1 | 158.71 | 127.0 | 188.37 | 150.7 | 239.43 | 191.5 |
| 90 | 121.40 | 109.3 | 158.71 | 142.8 | 188.37 | 169.5 | 239.43 | 215.5 |
| 100 | 121.40 | 121.4 | 158.71 | 158.7 | 188.37 | 188.4 | 239.43 | 239.4 |
| 110 | 121.40 | 133.5 | 158.71 | 174.6 | 188.37 | 207.2 | 239.43 | 263.4 |
| 120 | 121.40 | 145.7 | 158.71 | 190.5 | 188.37 | 226.0 | 239.43 | 287.3 |
| 130 | 121.40 | 157.8 | 158.71 | 206.3 | 188.37 | 244.9 | 239.43 | 311.3 |
| 140 | 121.40 | 170.0 | 158.71 | 222.2 | 188.37 | 263.7 | 239.43 | 335.2 |
| 150 | 121.40 | 182.1 | 158.71 | 238.1 | 188.37 | 282.6 | 239.43 | 359.1 |
| 160 | 121.40 | 194.2 | 158.71 | 253.9 | 188.37 | 301.4 | 239.43 | 383.1 |
| 170 | 121.40 | 206.4 | 158.71 | 269.8 | 188.37 | 320.2 | 239.43 | 407.0 |
| 180 | 121.40 | 218.5 | 158.71 | 285.7 | 188.37 | 339.1 | 239.43 | 431.0 |
| 190 | 121.40 | 230.7 | 158.71 | 301.5 | 188.37 | 357.9 | 239.43 | 454.9 |
| 200 | 121.40 | 242.8 | 158.71 | 317.4 | 188.37 | 376.7 | 239.43 | 478.9 |
| 210 | 121.40 | 254.9 | 158.71 | 333.3 | 188.37 | 395.6 | 239.43 | 502.8 |
| 220 | 121.40 | 267.1 | 158.71 | 349.2 | 188.37 | 414.4 | 239.43 | 526.7 |
| 230 | 121.40 | 279.2 | 158.71 | 365.0 | 188.37 | 433.3 | 239.43 | 550.7 |
| 240 | 121.40 | 291.4 | 158.71 | 380.9 | 188.37 | 452.1 | 239.43 | 574.6 |
| 250 | 121.40 | 303.5 | 158.71 | 396.8 | 188.37 | 470.9 | 239.43 | 598.6 |

**Figure 21. Occupants Weights**

## CONSUMABLES AND BAGGAGE

Forward Baggage Compartment is limited to 100 lbs capacity.

Aft Baggage Compartment is limited to 400 lb capacity with the load evenly spread between the three baggage areas (forward 160 lb, Mid 120 lb, Aft 120 lb); items should be secured with the straps provided.

| Weight | Fwd Baggage | | Aft Baggage (Fwd) | | Aft Baggage (Mid) | | Aft Baggage (Aft) | |
|---|---|---|---|---|---|---|---|---|
| (lb) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in | mom/100 (lb) | F-Sta (in) | mom/100 (lb.in) |
| 10 | 54.3 | 5.4 | 311.65 | 31.2 | 331.5 | 33.2 | 347.65 | 34.8 |
| 20 | 54.3 | 10.9 | 311.65 | 62.3 | 331.5 | 66.3 | 347.65 | 69.5 |
| 30 | 54.3 | 16.3 | 311.65 | 93.5 | 331.5 | 99.5 | 347.65 | 104.3 |
| 40 | 54.3 | 21.7 | 311.65 | 124.7 | 331.5 | 132.6 | 347.65 | 139.1 |
| 50 | 54.3 | 27.2 | 311.65 | 155.8 | 331.5 | 165.8 | 347.65 | 173.8 |
| 60 | 54.3 | 32.6 | 311.65 | 187.0 | 331.5 | 198.9 | 347.65 | 208.6 |
| 100 | 54.3 | 54.3 | 311.65 | 311.7 | 331.5 | 331.5 | 347.65 | 347.7 |
| 120 | Max Compartment Allowable = 100.0 lb | | 311.65 | 374.0 | 331.5 | 397.8 | 347.65 | 417.2 |
| 160 | | | 311.65 | 498.6 | | | | |

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**Figure 22. Baggage**

| Weight | LH Cabinet | | RH Cabinet | | Luggage Valet | |
|---|---|---|---|---|---|---|
| (lb) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in) | mom/100 (lb) | F-Sta (in) | mom/100 (lb.in) |
| 10 | 141.77 | 14.2 | 143.86 | 14.4 | 162.63 | 16.3 |
| 20 | 141.77 | 28.4 | 143.86 | 28.8 | 162.63 | 32.5 |
| 22 | | | 143.86 | 31.6 | 162.63 | 35.8 |
| 30 | | | | | 162.63 | 48.8 |
| 40 | | | | | 162.63 | 65.1 |
| 50 | | | | | 162.63 | 81.3 |
| | Max Refreshment Cabinet Load = 20.0 lb | | Max Refreshment Cabinet Load = 22.0 lb | | Max Compartment Allowable = 50.0 lb | |

| Weight | Vanity Carry-on | | Vanity Water | | Lav Water | |
|---|---|---|---|---|---|---|
| (lb) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in) | mom/100 (lb) | F-Sta (in) | mom/100 (lb.in) |
| 1.25 | 270.84 | 3.4 | | | | |
| 5.0 | | | 271.42 | 13.6 | | |
| 10.6 | | | | | 273.16 | 28.9 |

**Figure 23. Consumables and Storage**

# CENTER OF GRAVITY LIMITS

## WEIGHT AND CG ENVELOPE

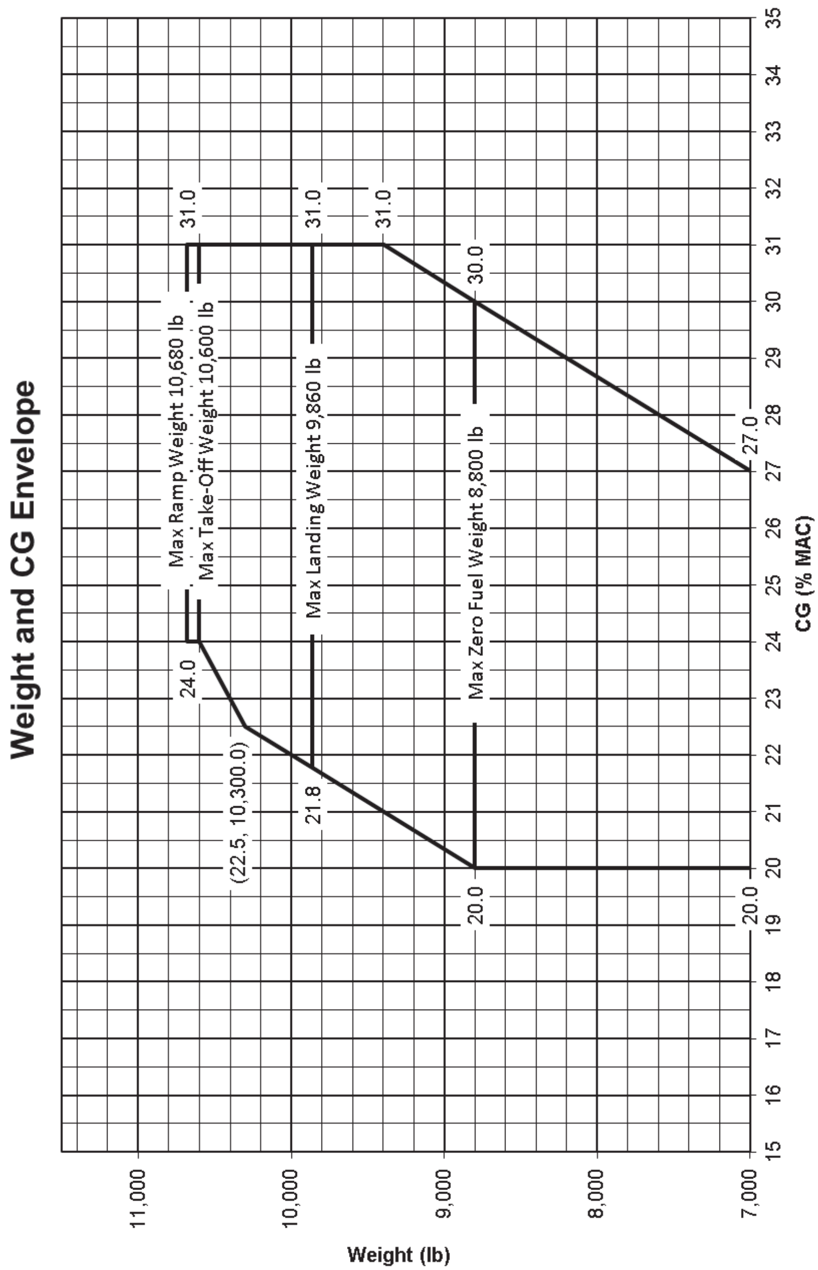


**Figure 24. Weight and CG Envelope**

## LOADING ENVELOPE LIMITS

Below are the forward and aft limits of the weight and CG envelope.

| | Weight | Fwd Limit | | | Aft Limit | | |
|---|---|---|---|---|---|---|---|
| | lb | F-Sta | Moment/100 | %MAC | F-Sta | Moment/100 | % MAC |
| | 7,000 | 244.14 | 17,090.1 | 20.00 | 248.32 | 17,382.7 | 27.00 |
| | 7,100 | 244.14 | 17,334.2 | 20.00 | 248.42 | 17,638.1 | 27.17 |
| | 7,200 | 244.14 | 17,578.4 | 20.00 | 248.52 | 17,893.7 | 27.33 |
| | 7,300 | 244.14 | 17,822.5 | 20.00 | 248.62 | 18,149.5 | 27.50 |
| | 7,400 | 244.14 | 18,066.7 | 20.00 | 248.72 | 18,405.5 | 27.67 |
| | 7,500 | 244.14 | 18,310.8 | 20.00 | 248.82 | 18,661.7 | 27.83 |
| | 7,600 | 244.14 | 18,554.9 | 20.00 | 248.92 | 18,918.0 | 28.00 |
| | 7,700 | 244.14 | 18,799.1 | 20.00 | 249.02 | 19,174.6 | 28.17 |
| | 7,800 | 244.14 | 19,043.2 | 20.00 | 249.12 | 19,431.4 | 28.33 |
| | 7,900 | 244.14 | 19,287.4 | 20.00 | 249.22 | 19,688.4 | 28.50 |
| | 8,000 | 244.14 | 19,531.5 | 20.00 | 249.32 | 19,945.6 | 28.67 |
| | 8,100 | 244.14 | 19,775.7 | 20.00 | 249.42 | 20,203.0 | 28.83 |
| | 8,200 | 244.14 | 20,019.8 | 20.00 | 249.52 | 20,460.5 | 29.00 |
| | 8,300 | 244.14 | 20,264.0 | 20.00 | 249.62 | 20,718.3 | 29.17 |
| | 8,400 | 244.14 | 20,508.1 | 20.00 | 249.72 | 20,976.3 | 29.33 |
| | 8,500 | 244.14 | 20,752.2 | 20.00 | 249.82 | 21,234.5 | 29.50 |
| | 8,600 | 244.14 | 20,996.4 | 20.00 | 249.92 | 21,492.9 | 29.67 |
| | 8,700 | 244.14 | 21,240.5 | 20.00 | 250.02 | 21,751.4 | 29.83 |
| **MZFW** | **8,800** | **244.14** | **21,484.7** | **20.00** | **250.12** | **22,010.2** | **30.00** |
| | 8,900 | 244.24 | 21,737.7 | 20.17 | 250.22 | 22,269.2 | 30.17 |
| | 9,000 | 244.34 | 21,990.9 | 20.33 | 250.32 | 22,528.4 | 30.33 |
| | 9,100 | 244.44 | 22,244.3 | 20.50 | 250.41 | 22,787.7 | 30.50 |
| | 9,200 | 244.54 | 22,497.9 | 20.67 | 250.51 | 23,047.3 | 30.67 |
| | 9,300 | 244.64 | 22,751.7 | 20.83 | 250.61 | 23,307.1 | 30.83 |
| | 9,400 | 244.74 | 23,005.7 | 21.00 | 250.71 | 23,567.0 | 31.00 |
| | 9,500 | 244.84 | 23,259.9 | 21.17 | 250.71 | 23,817.8 | 31.00 |
| | 9,600 | 244.94 | 23,514.3 | 21.33 | 250.71 | 24,068.5 | 31.00 |
| | 9,700 | 245.04 | 23,768.9 | 21.50 | 250.71 | 24,319.2 | 31.00 |
| | 9,800 | 245.14 | 24,023.7 | 21.67 | 250.71 | 24,569.9 | 31.00 |
| **MLW** | **9,860** | **245.20** | **24,176.6** | **21.77** | **250.71** | **24,720.3** | **31.00** |
| | 9,900 | 245.24 | 24,278.6 | 21.83 | 250.71 | 24,820.6 | 31.00 |
| | 10,000 | 245.34 | 24,533.8 | 22.00 | 250.71 | 25,071.3 | 31.00 |
| | 10,100 | 245.44 | 24,789.2 | 22.17 | 250.71 | 25,322.0 | 31.00 |
| | 10,200 | 245.54 | 25,044.8 | 22.33 | 250.71 | 25,572.7 | 31.00 |
| | 10,300 | 245.64 | 25,300.6 | 22.50 | 250.71 | 25,823.5 | 31.00 |
| | 10,400 | 245.94 | 25,577.3 | 23.00 | 250.71 | 26,074.2 | 31.00 |
| | 10,500 | 246.23 | 25,854.6 | 23.50 | 250.71 | 26,324.9 | 31.00 |
| **MTOW** | **10,600** | **246.53** | **26,132.5** | **24.00** | **250.71** | **26,575.6** | **31.00** |
| **MRW** | **10,680** | **246.53** | **26,329.7** | **24.00** | **250.71** | **26,776.2** | **31.00** |

**Figure 25. Loading Envelope Limits**

# USABLE FUEL

The figure below shows the values for fuel quantity in gallons along with the corresponding weight and fuselage station for fuel of various densities.

| Fuel | 6.3 lb/gallon | | 6.5 lb/gallon | | 6.7 lb/gallon | | 6.9 lb/gallon | | 7.1 lb/gallon | |
|---|---|---|---|---|---|---|---|---|---|---|
| Quantity (gallons) | weight (lb) | mom/100 (lb.in) | weight (lb) | mom/100 (lb.in) | weight (lb) | mom/100 lb.in | weight (lb) | mom/100 (lb.in) | weight (lb) | mom/100 (lb.in) |
| 10 | 63 | 165 | 65 | 170 | 67 | 175 | 69 | 181 | 71 | 186 |
| 20 | 126 | 329 | 130 | 340 | 134 | 350 | 138 | 360 | 142 | 371 |
| 30 | 189 | 493 | 195 | 509 | 201 | 524 | 207 | 540 | 213 | 555 |
| 40 | 252 | 656 | 260 | 677 | 268 | 698 | 276 | 719 | 284 | 739 |
| 50 | 315 | 819 | 325 | 845 | 335 | 871 | 345 | 897 | 355 | 923 |
| 60 | 378 | 981 | 390 | 1,013 | 402 | 1,044 | 414 | 1,075 | 426 | 1,106 |
| 70 | 441 | 1,144 | 455 | 1,180 | 469 | 1,216 | 483 | 1,253 | 497 | 1,289 |
| 80 | 504 | 1,306 | 520 | 1,347 | 536 | 1,388 | 552 | 1,430 | 568 | 1,471 |
| 90 | 567 | 1,467 | 585 | 1,514 | 603 | 1,560 | 621 | 1,607 | 639 | 1,653 |
| 100 | 630 | 1,629 | 650 | 1,680 | 670 | 1,732 | 690 | 1,784 | 710 | 1,836 |
| 110 | 693 | 1,790 | 715 | 1,847 | 737 | 1,904 | 759 | 1,961 | 781 | 2,017 |
| 120 | 756 | 1,954 | 780 | 2,016 | 804 | 2,078 | 828 | 2,140 | 852 | 2,202 |
| 130 | 819 | 2,117 | 845 | 2,184 | 871 | 2,252 | 897 | 2,319 | 923 | 2,386 |
| 140 | 882 | 2,279 | 910 | 2,352 | 938 | 2,424 | 966 | 2,496 | 994 | 2,569 |
| 150 | 945 | 2,440 | 975 | 2,517 | 1,005 | 2,595 | 1,035 | 2,672 | 1,065 | 2,749 |
| 160 | 1,008 | 2,598 | 1,040 | 2,680 | 1,072 | 2,763 | 1,104 | 2,845 | 1,136 | 2,928 |
| 170 | 1,071 | 2,756 | 1,105 | 2,844 | 1,139 | 2,931 | 1,173 | 3,019 | 1,207 | 3,106 |
| 180 | 1,134 | 2,916 | 1,170 | 3,009 | 1,206 | 3,101 | 1,242 | 3,194 | 1,278 | 3,286 |
| 190 | 1,197 | 3,075 | 1,235 | 3,173 | 1,273 | 3,271 | 1,311 | 3,368 | 1,349 | 3,466 |
| 200 | 1,260 | 3,235 | 1,300 | 3,338 | 1,340 | 3,440 | 1,380 | 3,543 | 1,420 | 3,646 |
| 210 | 1,323 | 3,395 | 1,365 | 3,503 | 1,407 | 3,610 | 1,449 | 3,718 | 1,491 | 3,826 |
| 220 | 1,386 | 3,554 | 1,430 | 3,667 | 1,474 | 3,780 | 1,518 | 3,893 | 1,562 | 4,005 |
| 230 | 1,449 | 3,713 | 1,495 | 3,831 | 1,541 | 3,949 | 1,587 | 4,066 | 1,633 | 4,184 |
| 240 | 1,512 | 3,870 | 1,560 | 3,992 | 1,608 | 4,115 | 1,656 | 4,238 | 1,704 | 4,361 |
| 250 | 1,575 | 4,026 | 1,625 | 4,153 | 1,675 | 4,281 | 1,725 | 4,409 | 1,775 | 4,537 |
| 260 | 1,638 | 4,181 | 1,690 | 4,314 | 1,742 | 4,447 | 1,794 | 4,580 | 1,846 | 4,712 |
| 270 | 1,701 | 4,337 | 1,755 | 4,474 | 1,809 | 4,612 | 1,863 | 4,750 | 1,917 | 4,887 |
| 280 | 1,764 | 4,492 | 1,820 | 4,635 | 1,876 | 4,777 | 1,932 | 4,920 | 1,988 | 5,062 |
| 290 | 1,827 | 4,654 | 1,885 | 4,802 | 1,943 | 4,950 | 2,001 | 5,098 | 2,059 | 5,245 |
| 300 | 1,890 | 4,825 | 1,950 | 4,979 | 2,010 | 5,132 | 2,070 | 5,285 | 2,130 | 5,438 |
| 310 | 1,953 | 5,003 | 2,015 | 5,162 | 2,077 | 5,320 | 2,139 | 5,479 | 2,201 | 5,638 |
| 320 | 2,016 | 5,187 | 2,080 | 5,351 | 2,144 | 5,516 | 2,208 | 5,681 | 2,272 | 5,845 |
| 330 | 2,079 | 5,371 | 2,145 | 5,542 | 2,211 | 5,712 | 2,277 | 5,883 | 2,343 | 6,053 |
| 340 | 2,142 | 5,554 | 2,210 | 5,731 | 2,278 | 5,907 | 2,346 | 6,083 | 2,414 | 6,260 |
| 350 | 2,205 | 5,739 | 2,275 | 5,921 | 2,345 | 6,104 | 2,415 | 6,286 | 2,485 | 6,468 |
| 360 | 2,268 | 5,925 | 2,340 | 6,113 | 2,412 | 6,302 | 2,484 | 6,490 | 2,556 | 6,678 |
| 370 | 2,331 | 6,112 | 2,405 | 6,306 | 2,479 | 6,500 | 2,553 | 6,694 | 2,627 | 6,888 |
| 380 | 2,394 | 6,298 | 2,470 | 6,497 | 2,546 | 6,697 | 2,622 | 6,897 | 2,698 | 7,097 |
| 390 | 2,457 | 6,479 | 2,535 | 6,684 | 2,613 | 6,890 | 2,691 | 7,096 | 2,769 | 7,302 |
| 400 | 2,520 | 6,661 | 2,600 | 6,873 | 2,680 | 7,084 | 2,760 | 7,296 | 2,840 | 7,507 |
| 410 | 2,583 | 6,823 | 2,665 | 7,040 | 2,747 | 7,256 | 2,829 | 7,473 | 2,911 | 7,689 |
| 420 | 2,646 | 6,977 | 2,730 | 7,198 | 2,814 | 7,420 | 2,898 | 7,641 | 2,982 | 7,863 |
| 424 | 2,671 | 7,039 | 2,756 | 7,262 | 2,841 | 7,485 | 2,926 | 7,709 | 3,010 | 7,932 |

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**Figure 26. Usable Fuel**

## ENGINE OIL / UNUSABLE FUEL

| Weight | Engine Oil | | Trapped Fuel (Undrainable) | | Drainable Unusable Fuel | | Total Unusable Fuel | |
|---|---|---|---|---|---|---|---|---|
| (lb) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in) | mom/100 (lb.in) | F-Sta (in | mom/100 (lb) | F-Sta (in) | mom/100 (lb.in) |
| 12.3 | 320.00 | 39.2 | | | | | | |
| 8.4 | | | 254.87 | 21.4 | | | | |
| 37.0 | | | | | 257.70 | 95.4 | | |
| 45.4 | | | | | | | 257.18 | 116.8 |

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**NOTE** Unusable fuel (both Trapped and Drainable) is considered part of the Basic Empty Weight.

**Figure 27. Engine Oil / Unusable Fuel**

## APPENDIX A – BLANK FORMS

The following blank forms are available in this Appendix A:

**Basic Empty Weight and Balance Form: Sheet 1**

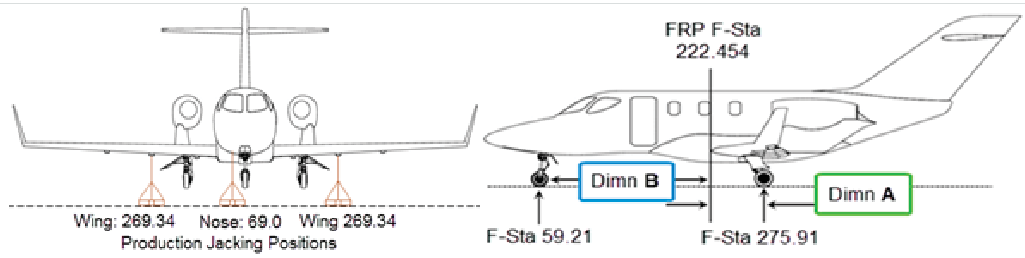
**Basic Empty Weight and Balance Form: Sheet 2**

**Basic Empty Weight and Balance Record**

**Weight and Balance Loading Form**

Sheet 1 of 2

## HA-420 - Basic Empty Weight and Balance Form




**Location:** ______ **Model:** ______ **Serial #:** ______

**Date:** ______ **Weighed by:** ______

| Reaction Points | | Scale Reading | Tare | Net Weight | F-Sta | Mom/100 | % MAC |
|---|---|---|---|---|---|---|---|
| **Quality Stamp** | Left Main | | | | | | |
| | Right Main | | | | | | |
| | Main Total | | | | | | |
| | Nose | | | | | | |
| As Weighed Total (lb) | | | | | | | |

| Measurements: | Input | | static ref. |
|---|---|---|---|
| Dimn **A** *FRP to Center of Main Gear | | inches | 53.55 |
| Dimn **B** *FRP to Center of Nose Gear | | inches | 163.21 |

| Additions or Subtractions to as weighed condition. | lb | F-Sta | Mom/100 | % MAC |
|---|---|---|---|---|
| Subtract: | | | | |
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| **Basic Empty Weight** | | | | |

Sheet 2 of 2

**HA-420 - Basic Empty Weight and Balance Form**

Extra worksheet to document and capture items weighed but not part of basic empty weight (Overages) and basic empty weight items not in airplane at time of weighing (Shortages).

| Additions or Subtractions to as weighed condition. | lb | F-Sta | Moment/100 | % MAC |
|---|---|---|---|---|
| Subtract: (Overages) | | | | |
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| **Total Subtractions** | | | | |
| Add: (Shortages) | | | | |
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| **Total Additions** | | | | |

Measuring Equipment:

**Scale Type:** ____________ **Increments/Accuracy:** ____________

**Model Number:** ____________ **Calibration Date:** ____________

Airplane Configuration: *Circle one **Flaps Retracted:** Yes /No*

**Fuel Qty:** ____________ lb/ gallon* **Defueled:** Yes/No* **Drained:** Yes/No*

**Level Info:** ____________ **Lateral:** Yes/No* **Longitudinal:** Yes/No*

Notes/Remarks:

Basic Empty Weight and Balance Record

Honda Aircraft Model: HA-420
Serial #:

| Date | Item | | Item Description or Modification | Added | | | Removed | | | Running BEW | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Add | Rem | | weight (lbs) | arm (in) | moment (lbs.in)/100 | weight (lbs) | arm (in) | moment (lbs.in)/100 | weight (lbs) | arm (in) | moment (lbs.in)/100 |
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Weight & Balance Loading Form

**HA-420 Serial#**
**Date:**

| Line | Item Description | weight (lbs) | arm (in) | moment (lbs.in)/100 | %MAC |
|---|---|---|---|---|---|
| | | | | | |
| 1 | **Basic Empty Weight** | | | | |
| | | | | | |
| 2 | Pilot | | | | |
| 3 | Copilot | | | | |
| 4 | Crew Equipment | | | | |
| 5 | Provisions-Cabinet | | | | |
| 6 | **Operating Weight** | | | | |
| | | | | | |
| 7 | Side Facing Passenger | | | | |
| 8 | Fwd LH Pasenger | | | | |
| 9 | Fwd RH Passenger | | | | |
| 10 | Aft LH Passenger | | | | |
| 11 | Aft RH Passenger | | | | |
| 12 | Miscellaneous | | | | |
| 13 | Cabin Baggage | | | | |
| 14 | Aft Baggage (Max 400) | | | | |
| 15 | Fwd Baggage (Max 100) | | | | |
| 16 | **Zero Fuel Weight (Limit 8,800)** | | | | |
| | | | | | |
| 17 | Fuel Weight | | | | |
| 18 | **Ramp Weight (Limit 10,680)** | | | | |
| | | | | | |
| 19 | Minus Taxi/Run-up Fuel | | | | |
| **20** | **Take-off Weight (Limit 10,600)** | | | | |
| | | | | | |
| 21 | Zero Fuel Weight (s/as line 16) | | | | |
| 22 | Estimated Fuel Remaining | | | | |
| 23 | **Landing Weight (Limit 9,860)** | | | | |

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